41

the OIL AND GAS JOURNAL

MAY 21
1936

PETROLEUM
EXPOSITION
NUMBER

2

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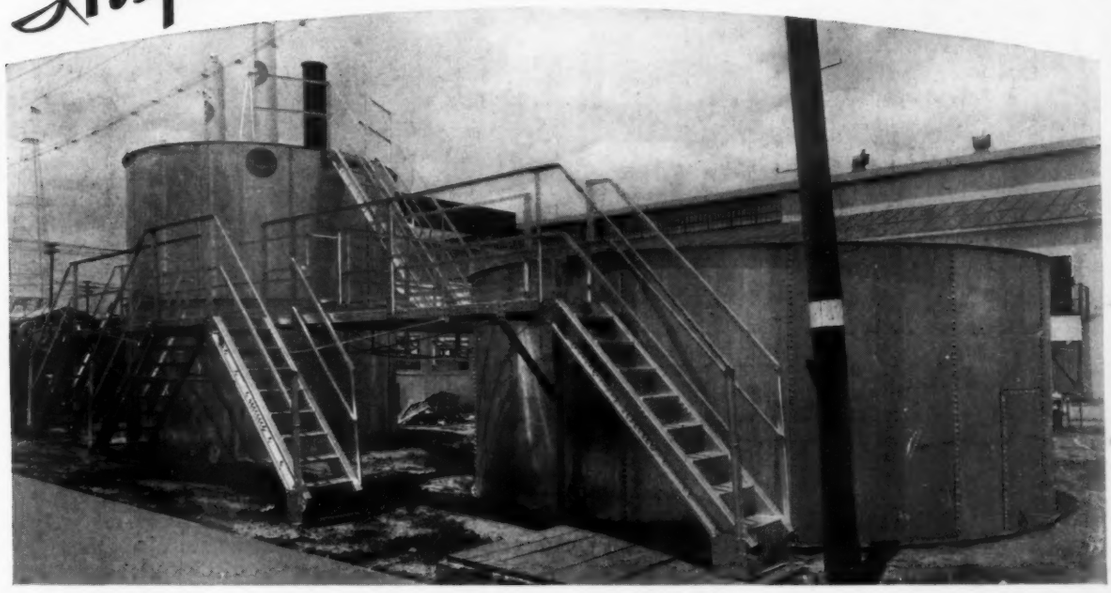

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Our display at the Exposition consists of a high-type and a low-type 500-barrel double hot-dip galvanized tank with an assembly of our sectional steel stairway and walkway with cantilever type and self-supporting construction. The walkways have welded corners and underneath welded supports every two feet. Both stairway and walkway are non-skid. The height of the railing is 42" from the top of walkway.

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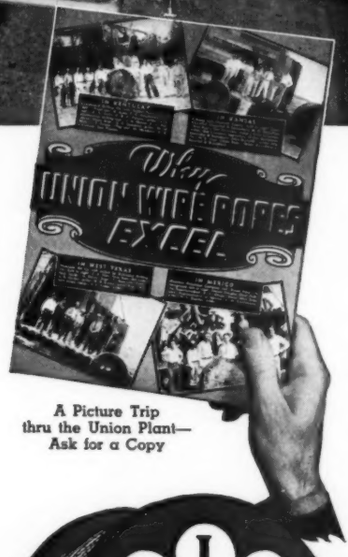
We think you will be interested in seeing our exhibit, depicting the wire rope industry in miniature. The entire operation of the exhibit is automatic, the two trains contacting switches and stops to control their own movements and all loading and unloading operations, through semaphores, switches, gates, etc.

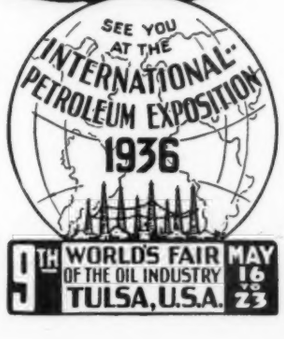
Rods are picked up at the steel plant and delivered to the wire rope plant, and the finished reels of rope are then delivered to the logging, mining and oil industries.

The exhibit was conceived and built by our own mechanical staff at our Kansas City plant.

Don't Fail to Visit Us at
Booths 80 and 130, Texas Building



A Picture Trip
thru the Union Plant—
Ask for a Copy



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MAY 21, 1936
VOL. 35, NO. 1

Extra copies of special issues are reserved for subscribers' needs and may be purchased by subscribers at the price of 50 cents per copy

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Look on pages 187 to 192 of the 1936 COMPOSITE CATALOG

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SAFETY • SIMPLICITY
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LOW COSTS • LONG LIFE
in a single tool!

Here's What You Can Do with a Baker Rotary Wall Scraper...

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BAKER ROTARY WALL SCRAPER

Production Passes Three Million Daily

AS daily average crude production over a period of a week passed 3,000,000 barrels for the first time there were several current situations which were disturbing to those most familiar with conditions. The average daily production was an increase of 43,068 barrels over the previous week and was far in excess of the demands for May as estimated by the Bureau of Mines and the A.P.I. Committee on Supply and Demand.

The government bureau at the close of April estimated that an average daily production of 2,826,300 barrels would take care of May demands and permit a 65,000-barrel daily withdrawal from storage. While this estimate now appears too low as has been the case in previous months, recent government data reporting additions to crude oil storage, show that the actual production has been in excess of requirements. All of the major producing states are offenders in the overproduction trend with only Michigan and Arkansas producing less than the estimated demands.

Largely the same situation obtains in the refining end where crude runs to stills are running approximately 100,000 barrels daily in excess of recommendations. The result is that plant output is taking care of current motor fuel demand and there have been no important withdrawals from storage which are eight to ten million barrels higher than had been recommended for this time of the year. Indications of market weakness continue in several areas.

In this general situation Louisiana with 56,000 barrels daily production in excess of the bureau's estimated demand occupies an important position. The continued large allowable of one operator in Louisiana and the major extension of the field in Cass County, Texas, have aggravated the Rodessa situation.

Production 3,005,440
Increase 43,068

Prospect of a new pool between the Fruitvale and Buena Vista fields in the San Joaquin basin in California was indicated by showings in a test of the Ohio and Shell oil companies. Three prospective fields in the Gulf Coast, two in Texas and one on the Conroe trend in Louisiana, were features of the week's news from that producing division. Fifty-four new operations were reported from the West Texas field and extensions to Winkler and Ward County pools reported. New wells in the Talco field have encouraged lease owners there to the belief that they are in important oil region, and that northeastern Texas area is expected to be subjected to much development work this summer. The Saxet Heights field in Southwest Texas was extended northwesterly and a new oil pay was found in the Samfordyce field. Four pools in Reno, Ellis and McPherson Counties, Kansas, were extended.

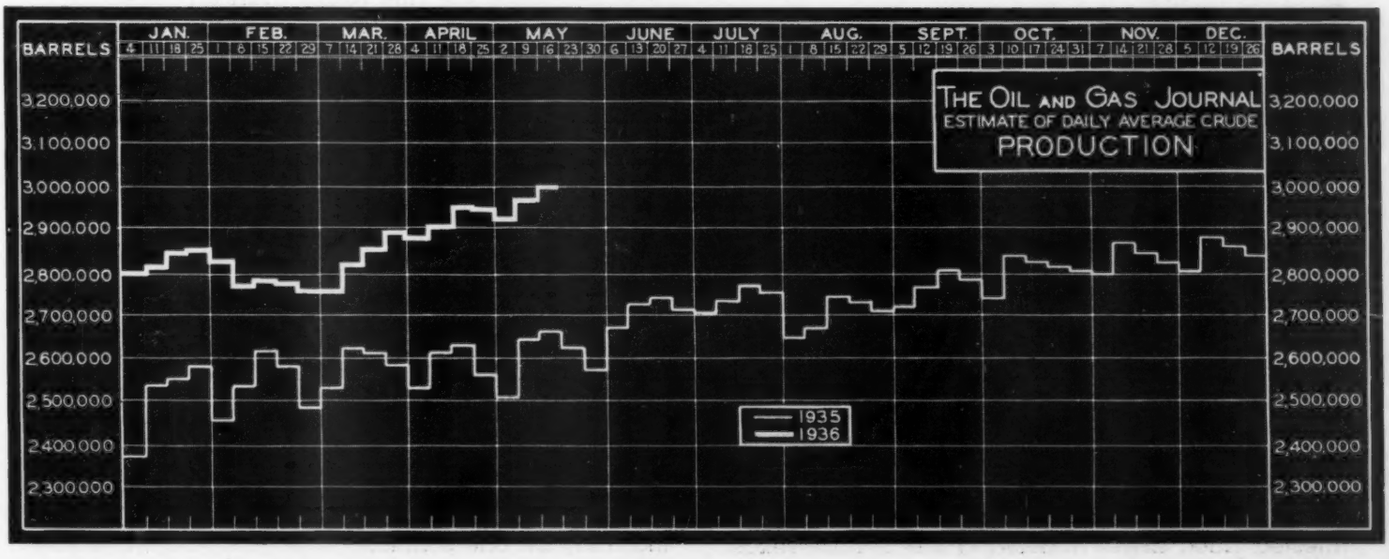
Daily Average Production for Week

	May 16 1936	May 9 1936	May 18 1935
Oklahoma City	155,400	127,950	177,750
Seminole-St. Louis	105,225	102,675	102,775
Remainder of State	299,900	307,200	262,975
Total Oklahoma	560,525	537,825	543,500
East Texas	455,197	457,739	458,204
West Texas	185,137	185,050	143,605
North Central Texas	85,250	84,650	91,363
Texas Panhandle	63,032	56,744	65,918
East Central Texas	55,336	52,897	48,409
Gulf Coast—Texas	254,792	252,487	179,556
Southwest Texas	81,387	81,145	58,413
Total State of Texas	1,180,131	1,170,712	1,045,468
North Louisiana	82,535	73,855	22,990
Gulf Coast Louisiana	144,150	145,350	109,705
Total Louisiana	226,685	219,205	132,695
Santa Fe Springs	45,000	45,100	37,250
Long Beach	68,000	68,250	68,500
Mountain View	28,200	27,900	9,400
Kettleman Hills	80,000	81,250	61,750
Remainder of State	360,600	361,400	334,100
Total California	581,800	583,900	511,000
Kansas	160,500	155,200	152,475
Arkansas	29,960	29,925	31,200
Eastern fields	108,200	108,000	107,000
Michigan	34,899	34,195	39,125
Rocky Mountain area	122,740	123,410	98,140
Total United States	3,005,440	2,962,372	2,660,603

Crude Oil Stocks in U. S.

(BUREAU OF MINES ESTIMATES)

Week ending May 2, 1936	314,192,000 Bbls.
Week ending April 25, 1936	313,132,000 Bbls.
Week ending May 4, 1935	343,576,800 Bbls.



SPARKS FROM THE NEWS

Invitation

Texas reduces state allowable 50,000 barrels a day and invites Governor Leche of Louisiana to sit in.

Folly

If refiners persist in supplying current demand from daily output what will they do with the eight million barrel surplus? Or what will it do to them?

Mirage

Millions for farmers in "alky-gas" must be same millions that were promised in denatured alcohol generation ago.

Opposites

Higher production and higher prices never go together. Remember that!

Prodigals

California and Louisiana, outside interstate compact, produced 17,000,000 barrels more crude in first quarter than year ago. Haste makes waste.

Deadlock

House Democrats held secret caucus on oil import tax bill. But state department makes no secret of its opposition.

Gauge

Potential importance of Rodessa field may be measured by magnitude of purchases by majors.

Omen

Bill in house to make Ickes secretary of Department of Conservation might have been significant before Guffey decision.

Zoo

Oil "wild game" theory give color to that "tick-infested" idea about Rodessa crude in East Texas.

Warning

Proposal to amend Connally act to ban interstate transportation of oil produced in excess of state "or federal" quotas may give Louisiana and California something to think about.

Mentality

Pithole teamsters opposing pipe lines had exactly same view as coal men asking tax on fuel oil.

Dilemma

Pennsylvania legislators shown higher gasoline tax will lessen revenue and "soak the poor." Both foolish and dangerous.

Specialty

Doctor Egloff visions day when every little hydrocarbon molecule will have a utility of its own. There's potential for you.

Shock

That three million barrels a day production is here—a little ahead of time.

Necessity

Recently announced major pipe line extensions reflect fact economical transportation connecting new fields and refineries is essential.

Habit

Crude oil stocks went up another million barrels. Becoming the rule rather than an exception.

Exposition

The International Petroleum Exposition shows one reason why oil industry forges ahead. It constantly has new and better tools.

Union

Time has arrived again when petroleum industry should recall the historic alternative of hanging together or hanging separately.

Puncture

If Pelican peak of 19,000 barrels is down to 15,000 that may be one solution.

Snap and Color Mark Opening of Great Oil Show

President W. A. Irvin, U. S. Steel Corporation, delivering opening address

By T. F. SMILEY

President W. G. Skelly's finger tightened on the trigger of a frontier pistol pointed skyward as he stood on the speakers' stand in Drake Drive at the International Petroleum Exposition grounds, Tulsa, Saturday afternoon. Five times the ancient weapon cracked.

Nine bombs, each releasing an American flag, exploded high in the air. Overhead the biggest American flag in existence, 60 by 80 feet, billowed between two oil derricks. The band struck up the national anthem.

Tulsa's ninth oil show, drawing visitors and exhibits from almost every part of the world, was open.

Marvelous as the 8-day show itself is, there was a dash and an air of confidence in the opening ceremonies—missing since the 1929 show—that make them worth more than passing mention. They had caught the spirit of snap and aggressiveness now manifested by the oil business. They seemed symbolic of the new era into which the industry is moving after five hard years which drew upon reserves of pluck, patience, daring, sagacity and upon clear-visioned foresight. The crowd felt the difference. The atmosphere of hesitation and faintly concealed anxiety was gone. Eagerness and enthusiasm had taken its place.

Ceremonies in Drake Drive

W. A. Irvin, president of the United States Steel Corp., the principal speaker, ascended the stand erected at the north end of Drake Drive, accompanied by E. W. Marland, governor of Oklahoma, and others who were to take part in the exercises, shortly after 2 o'clock. In the Twenty-first Street entrance at the south end were stationed the military band of the Oklahoma A. and M. College and Boy Scouts carrying flags of many countries, significant of the international character of the show. The space between the stand at the north end and the entrance at the south end was flanked by mounted cowmen and cowgirls from Pawnee Bill's rodeo show.

As the aerial bombs began bursting overhead Bob Hulett, ranch manager for Pawnee Bill and gay in a garish green shirt, rode his handsome white mount "hell bent for breakfast," as one onlooker put it, straight down the broad thoroughfare, apparently intent on running down the military band. Women gasped. But within a few feet of the uniformed musicians, who hid their nervousness if they felt any, Bob's deft hand brought his horse up suddenly. He turned right about, and the march to the speakers' stand began.

Mayor T. A. Penney, of Tulsa, laying aside an impressive sombrero which he was wearing for the occasion, gave an address of welcome and introduced Governor Marland, former head of the Marland oil interests, merged several years ago with the Continental Oil Co. The governor paid a tribute to Mr. Skelly, president of the Skelly Oil Co. and president of the International Petroleum Exposition. He introduced Axtell J. Byles, president of the American Petroleum Institute, who referred to the fear entertained by some that the world's petroleum reserves are near depletion. "You and I," said Mr. Byles, "will not live to see the day when there will be a shortage of petroleum. However, that does not justify a waste of oil. Neither does it justify a bureau in Washington taking over this industry. We live and prosper or we perish as a great nation of competitive industries."

Mr. Byles introduced Mr. Irvin as a man who, born in Indiana County, Pennsylvania, near scenes of oil activity, had begun life as a messenger boy and had risen to the presidency of a mighty steel organization, but who was still known affectionately as "Bill." Mr. Irvin dwelled on the close relationship of the steel and the oil businesses and pointed out how each had come to depend on the other.

Prophets of Disaster Mistaken

"For many years," said Mr. Irvin, "we have been told that the resources of petroleum will, in a few years, be at the exhaustion point. The prophets of disaster failed to take into account the resourcefulness of your industry.

"The steel and oil industries seem to be inseparably related, and one dependent on the other. We are proud of the place we have had in the development of the oil industry. You have added another and deeper layer of the earth's crust to your field of operation and for the accomplishment of this have demanded better tools and better steels. I talked the other day with men

U.S.S.R. DELEGATION AT PETROLEUM EXPOSITION

—Paul Stithem Studio.

Left to right: John Tkach, Tulsa, interpreter; M. B. Markovitch, Leningrad; E. Ginsburg, Baku; I. F. Korneenkov; N. Titkoff, Moscow; B. D. Drytchenko, Grosny; V. V. Poliakov, Moscow; N. V. Samastrelov, Ufa; J. L. Davidovitch, Ufa; and Paul Stoopin, interpreter; back row, P. Fredrow, A. M. Gabrialean, A. Katz, interpreter, M. Iskanderov, S. S. Merenbeck, San Francisco, and Leon Feferman, interpreter

who drilled the first well in the Kettleman Hills; a dry hole, because in those days the limitation that steel and machinery placed upon the depth of drilling would not permit that rich storehouse to be tapped. You gentlemen have buried more steel than any other group of men in the world and, in so doing, you have contributed materially in keeping the steel industry alive and active. May you continue to bury steel, ton after ton.

"The comparatively brief history of your activities is replete with the exhibition of those qualities which have made American enterprise the envy of all nations. Courage, foresight, ingenuity, perseverance, and skill have accomplished in 80 years what lay dormant for centuries."

Following Mr. Irvin's address V. V. Poliakov, Moscow, Russia, vice-president and chief engineer of the Glavneft Oil Co., extended a fraternal message from the oil industry of his own country, speaking first in Russian and then in English.

Preceding the ceremony of formally opening the exposition Mr. Skelly told how this international enterprise had been established in the heart of a vast oil country for the exhibition and practical demonstration of improved machinery and methods of producing oil and its derivatives and for the interchange of ideas concerning problems of the oil industry. "In these few short years," said Mr. Skelly, "this exposition has become the clearing-house for every phase of the oil business. Its practical value to the petroleum industry and allied industries has amply repaid the vision and faith of its founders and those who have contributed to its success."

A dilemma that faced the exposition management this year, W. B. Way, general manager, said, lay in the problem of accommodating all who wanted space in which to display equipment or to demonstrate improved methods in some branch of the oil industry. Every inch available in the 20 acres owned by the organization is taken. Each day and evening steady streams of visitors have moved through the aisles of the spacious exhibit buildings. In the open-air areas hundreds have watched the operation of drilling, pumping and other heavy machinery.

This year's show is amazingly big and filled with engineering wonders. It is carefully planned in its every detail and rich in its educational values. It deserves the words of praise accorded by all who have seen it. "Gigantic mechanical marvels of the modern world," Mayor Penney called the exhibits. "Most perfect show of its kind in the world," said Governor Marland. "Nothing else like it on earth," declared Mr. Skelly.

Here are the latest achievements in welding equipment; drilling tools; indicating, recording and control instruments; power units; pumping equipment; fishing tools; tubular goods; oil and gas separators; pipe-laying machinery; pressure-regulating devices; tanks and fittings; well-shooting devices; pipe coatings; refinery equipment—everything, in fact, that is needed in producing, transporting, refining and marketing oil and its derivatives. There are approximately 10,000 exhibits, representing 546 companies and a total value estimated at $12,000,000.

Well-Known Men Present

Among those visiting the show are men whose names stand high in the oil industry at home or abroad. The first two who registered from foreign countries were themselves Americans, Marshall Brown, of the Venezuela Gulf Oil Co., Maracaibo, Venezuela, and Joseph A. Holmes, Standard Oil Co., Capito, Venezuela. Registering from England are A. J. Hayworth, of the Royal School of Mines, London; Niels Matheson, a member of the Institute of Petroleum Technologists, and the American Institute of Mining and Metallurgical Engineers, and Cyril F. Dennis, London, deputy director of W. B. Dick & Co., London and New York.

Soviet Russia has the largest number of representatives. Heading the group is M. V. Barinoff, Moscow, president of the Petroleum Industry of the U.S.S.R. The other members are A. Iskanderov, Baku, Azneft Oil Co.; Mr. Ginsburg, Batoum, Azneft Oil Co.; P. Federov, Grosny, with the Grosneft Oil Co.; Michael B. Markovitch, Leningrad, professor of the Chemico-Technological Instrument Co.; B. Titkoff, Moscow, of the oil technical bureau; V. V. Poliakov, Moscow, vice president and chief engineer of the Glazneft Oil Co.; E. G. Permiakov, Emba, of the Amtorg Trading Corp.; S. V. Shumilin, Glazneft, of the Amtorg Trading Corp. Other delegates from the same company are B. D. Dyrtchenko, Grosny; N. V. Samostrelov, Ufa; I. F. Korneenkov, Neftegorsk; J. L. Davidovitch, Ufa, and A. M. Gabilian, Kokand. S. E. Merenback, Paul Stoopin and A. Katz are interpreters for the group.

Left to right: Robert Gregg, U. S. Steel Corp.; Vice President B. F. Harris, Oil Well Supply Co. (U. S. Steel subsidiary); President E. B. Reeser, Barnsdall Corp.; Governor E. W. Marland of Oklahoma; President William G. Skelly, International Petroleum Exposition and Skelly Oil Co.; President William A. Irvin, U. S. Steel Corp.; President R. Otis McClintock, First National Bank and Trust Co., Tulsa; C. H. Rhodes, U. S. Steel; President Axtell J. Byles, American Petroleum Institute; President Henry Greis, Burke-Greis Oil Co., and Mayor T. A. Penney of Tulsa

From Upper Burma

E. J. Daly is the representative from Upper Burma, India. The remainder of the delegates and their countries are as follows: Harry von Rautenkranz, Celle-Hanover, Germany, with the International Tiefbohr Co., and his associate, Consul Hermann von Rautenkranz. From Mexico City, Mexico, are Fernando Oritz Hidalgo, of Petromex, and Senor Ezequiel Ordonez, son of the former president of Mexico, both of whom are guests of W. G. Green, of the Seismograph Service Corp. of Tulsa. Isidor Herriez, Barcelona, Spain, left Tulsa Sunday night. Werner Muller, with Alfred Wirth & Co., from Rhineland, Germany, was here ahead of the German group scheduled to arrive this week.

Delegates from Canada are G. A. MacNeil, Winnipeg, of the Teaton Co., and L. W. Ward, Imperial Oil, Ltd., of Canada, Alberta. Rene Berg, of Paris, France, is the French delegate, and is French delegate for the World Petroleum Congress of Paris in 1937, and is also a representative of the Association Francaise Des Technicians Du Petrole. Others from foreign countries are E. A. Molina, university student, Caracas, Venezuela; Felix Mendoza, independent, Bogota, Colombia; N. A. Kominus, Greek Petroleum Syndicate, Athens, Greece; Ing. Manuel Alvarez, Jr., and Alfonso, both of the Petroleos de Mexico, Mexico City; S. Del Rio, Huasteca Petroleum, Tampico, Mexico, and B. R. Emerick, Burma Oil, Ltd., Rangoon, India.

All previous attendance records would be shattered before the show closes next Saturday night, Mr. Way predicted. On the opening day 18,726 persons passed through the gates, on Sunday 20,868, and on Monday 16,897. The total of 56,491 for the three days compares with 32,183 for the first three days of the 1934 show, a gain of 24,308, or more than 75 per cent.

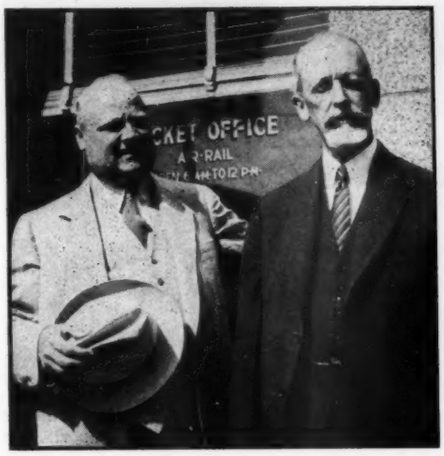
Real Old-Timers These

Among all the pleasant reunions which the exposition is bringing about the pleasantest perhaps are those of pioneers in the industry. Old-timers are registering at the Drake well replica under the direction of Reid S. McBeth, exposition secretary. In the first group that registered Mr. McBeth noted there were two men each 93 years old, W. H. Peiffer, of Carthage, Mo., and A. W. Gordon, of Tulsa. As the two nonagenarians were still in the booth he drew their attention to the coincidence. A friendly comparison of experiences revealed that Mr. Gordon had been born in Saegerstown, Crawford County, Pennsylvania, and Mr. Peiffer on a farm close to that town. Peiffertown, Crawford County, was named after the latter's family. The two never had seen each other till they met in the Drake well booth, after almost a century of life.

As a boy Mr. Peiffer began working around oil wells near Titusville, Pa., where he saw the famous Drake well. He soon became a driller and he worked on down Oil Creek and the Allegheny River through early oil fields famous in history—Petroleum Center, Tarr Farm, Rynd Farm, Rouseville, McClintockville (Coal Oil Johnnie's home), Oil City, Franklin, Parker's Landing and the rest. He served in the Civil War and then returned to the drilling tools. Eventually he quit the oil fields and settled on a farm in Jasper County, Missouri. About 10 years ago he retired to live in comfort in Carthage.

Mr. Gordon, whose father, Jesse Gordon, conducted a Saegerstown hotel widely known in western Pennsylvania, entered the producing branch of the oil business early, went to Oklahoma in 1902 and retired from active operations six years ago. He made fortunes—and lost them. Once in the early eighties, when he was speculating heavily in oil certificates, there was a disastrous break in the price of oil. Telegraph lines were choked with messages and he was unable to get into communication with his broker in Pittsburgh, Pa. He believed he had been wiped out. After the congestion had been cleared he received a telegram from his broker, "I protected your account." It meant that Mr. Gordon had saved at least $25,000 by the broker's friendly action. Mr. Gordon was chosen "Grand Old Man of the Industry" at the 1934 exposition.

Institute Protests Discriminatory Law to Benefit Competitors



R. L. Morton, Indian Territory Illuminating Oil Co.; W. N. Davis, Phillips Petroleum Co.

The petroleum industry was warned by President Axtell J. Byles of the American Petroleum Institute of the dangers inherent in a policy of "continuing to crowd production allowables to the limit" and failure to maintain refinery operation on a basis which would bring about a reduction in the present heavy stocks of gasoline. The statement calling for a slight curtailment in producing and refinery operations to bring about healthier supply and demand situation was issued in connection with the A.P.I. semiannual meeting held last week in Tulsa.

The three-day meeting, which was largely devoted to sessions of producing and refining technical groups and meetings of a large number of committees which carry on the special work of the Institute, also brought action on two matters by the board of directors. The board, after discussing some of the proposed federal and state legislation which would impose additional taxes on some of the industry's products with a view of aiding other industries, adopted a resolution condemning all such proposals as contrary to the best interest of public and industry generally. The proposal to tax natural gas and furnace oils to aid coal industry are examples.

"Free competition among industries—if unhampered by legislation designed to promote the welfare of one industry at the expense of another, alone will assure the public both of its right to enjoy the greatest possible industrial service at the least possible costs and of its privilege to use and enjoy the benefits of progress in any line of industrial endeavor as soon as they are available."

The board also placed the Institute on record as supporting the efforts being made to promote highway safety. In a resolution which received unanimous endorsement by the board it was recognized that the promotion of highway safety was necessary not only to protect human life but as an economic measure to assure "the continued and unrestricted development of highway transportation," which will be an important factor in the future demand for motor fuels and oils.

In aiding the safety programs attention was called to facilities of the industry at service stations. Pointing to the connection between safety and maintenance of improved highway systems the board in its resolution condemned the tendency of states more and more apparent to divert gasoline tax funds to purposes other than highway construction.

Regarding conditions in the oil industry since the start of the year, President Byles said:

"The severe weather of last winter necessitated heavy production of fuel oil at petroleum refineries, and, concurrently, abnormally large production of gasoline. While the weather encouraged fuel oil consumption, it discouraged gasoline demand by preventing the general operation of motor vehicles. As a result, refiners face the spring and summer motoring season with unnecessarily large stocks of gasoline.

"The first quarter of 1936 revealed an increase in gasoline demand of about 9 per cent above that of the first quarter of 1935. Indications are that second quarter gasoline demand will be about 6 per cent above that of second quarter of 1935. However, gasoline demand was abnormally heavy in 1935 and even the expected increases in motor vehicle registration and use this year probably will not be sufficient to assure gasoline consumption throughout the rest of 1936 at the same high rate as in the first and second quarters.

"A little foresight on the part of producers and a slight curtailment of crude oil output at the present time would tend to improve the situation later and obviate the usual effects of forcing too much crude oil upon the market. Also, a reduction by refiners of crude runs to stills would be helpful.

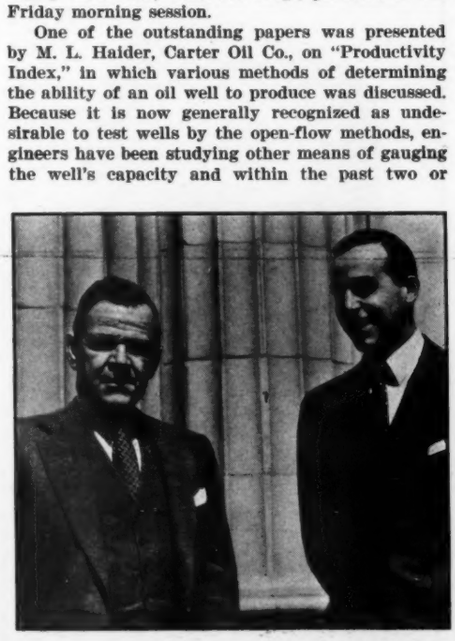
"Uncertainty as to future trends in taxation and legislation still exerts a discouraging influence upon essential planning for the future."

Production Committees

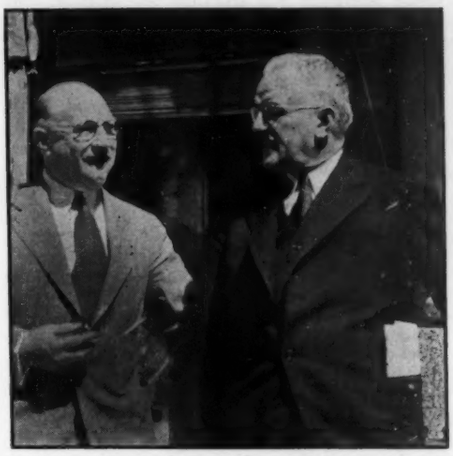
The mid-year meeting started with a series of committee meetings of the various groups interested in standardization and allied problems. These committee meetings continued through four days.

The production and refining divisions of the Institute held meetings starting Thursday morning. A number of the papers presented at these meetings were published in the May 14 and 21 issues of The Oil and Gas Journal. F. W. Floyd, Carter Oil Co., and John T. Hayward, Barnsdall Oil Co., were chairmen for the Thursday meetings, and Harry H. Power, Gulf Oil Corp., presided at the Friday morning session.

One of the outstanding papers was presented by M. L. Haider, Carter Oil Co., on "Productivity Index," in which various methods of determining the ability of an oil well to produce was discussed. Because it is now generally recognized as undesirable to test wells by the open-flow methods, engineers have been studying other means of gauging the well's capacity and within the past two or three years much progress has been made in the application of the bottom-hole pressure data to these problems.



H. C. Weiss, Humble Oil & Refining Co., and A. E. Pew, Jr., Sun Oil Co.



R. B. Jones, Panhandle Refining Co., and Walter Miller, Continental Oil Co.

Another paper receiving special consideration was along these same general lines and was presented by R. S. Christie, Amerada Petroleum Corp., Longview, Tex., and was entitled "Use of Recording Pressure Gauges in Drill-Stem Tests." The same instruments used in determining subsurface pressures in producing wells has been applied to the drill stem tests of various formations passed through in wildcat wells. By the combination of the drill-stem test and subsurface hole instruments much valuable data can be secured and if properly assembled and filed will provide information of much value to the production department later in handling the well.

Another paper dealing with instruments used in the production department was presented by Paul G. Exline, Gulf Research & Development Corp., Harmarville, Pa., during the Friday morning session entitled "A Precision Gauge for Subsurface Pressure Measurements."

K. R. Teis, engineer for E. H. Moore, Inc., Tulsa, one of the largest operators in the Fitts field, explained "Pressure Completion of Wells in the Fitts Pool" and pointed out the many advantages to be gained by the application of this method. The disadvantages were also discussed and in his summary Mr. Teis concludes the extra expense of about $3 per foot is justified, although the initial production of a group of wells completed by the pressure control and by the mud methods was practically the same.

Several papers dealing with various phases of the metallurgical problems confronting the production division of the petroleum industry were presented. The "Economic Life of Sucker Rods" was discussed by Emory Kemler, Gulf Oil Corp., Tulsa, and Marvin Cook, Humble Oil & Refining Co., Houston, Tex., presented an interesting paper on "Welded Joints for Oil-Well Casing," which is one form of metallurgical problem. A. G. Zima, International Nickel Co., Los Angeles, Calif., discussed "Nickel-Alloy Steels in Drilling Equipment," pointing out specifically the many uses to which these alloy steels are being put in the production end of this industry.

Miscellaneous papers on pumping, rotary drilling, and use of multicylinder gas engines were presented by R. E. Bridges, Humble Oil & Refining Co., Wichita Falls, Tex.; J. E. Brantly, Drilling & Exploration Co., Avenal, Calif., and D. G. Kingman, General Petroleum Corp. of California, Los Angeles, Calif.

The final paper on the technical program was in the nature of a report of the committee appointed by A.P.I. and U. S. Geological Survey to study source beds. Dr. Parker D. Trask, of the U.S.G.S.,

presented the results of the study he and W. Ross Keyte, A.P.I. research fellow, have recently completed covering the "Degree of Reduction of Sediments in the East Texas Basin as an Index of Source Beds." This is the third of these reports made by Doctor Trask, the other two dealing with Rocky Mountain and Mid-Continent regions, and three more are to be made covering California, Gulf Coast and Appalachian regions.

Refinery Division Meetings

The meetings of the refinery division were marked by timeliness of subjects and brief but frank discussion following presentation of papers. Considerable progress was reported by the chairmen of the technical and engineering committees, which met early in the week.

Principal interest was manifested in the solvent manufacture of lubricants, more particularly, the solvent dewaxing of these oils. In a paper by W. P. Gee, Texas Co., the use of furfural was discussed, complete operating data were presented regarding plant yields, types of stock which may be processed, cost of processing and recent changes in plant design. The complete paper appears elsewhere in this issue. Offering similar data, H. O. Forrest, of M. W. Kellogg Co., explained the application and recent developments in the use of propane as a deasphaltizing agent in refining and dewaxing

Engineers L. M. Goldsmith and Walter Samans, Atlantic Refining Co.

of lubricating stocks. While the discussion was tempered with the results obtained in using propane as a solvent in a number of refineries, operation of the new solvent plant of the Shell Petroleum Corp. at Wood River, Ill., was given in detail. This paper appears in this issue as a joint contribution of A. P. Anderson, H. O. Forrest and Lee van Horn.

G. G. Oberfell, Phillips Petroleum Co., chairman of the meeting, called for a general discussion of dewaxing and Dr. T. G. Delbridge, Atlantic Refining Co., offered data on the operation of the nitrobenzene process at the company's Philadelphia refinery. John W. Poole, consulting technologist, in discussing modern solvent refining, pointed out the highly technical problems involved and suggested their practical solution. The complete paper appeared in the May 14 issue of The Oil and Gas Journal.

Subjects of equal interest but appearing in a miscellaneous group were discussed in the meeting Thursday presided over by Frank Holsten, Barnsdall Oil Co. The clay treatment of motor fuels was discussed by Dr. M. R. Mandelbaum, Gray Process Corp., followed by that of Gustav Egloff, Universal Oil Products Co., who discussed the intricacies of instrumentation in modern refining. Of equally practical value was the paper presented by W. B. Hart, Atlantic Refining Co., on "Controlled Disposal of Wastes Vs. Pollution, in which he said in part: "The industry has made itself a lot of trouble; it has taught many things to those who, though sincere, lean toward the impractical and prohibitory; it is bearing the burden of blame for all pollution, since that from domestic sewage, although it constitutes possibly 75 per cent of the total, is not much advertised. Industry is the target of public ill will, and is gradually being driven into a corner by legislative schemes—one of which sooner or later will very likely become a law.

COMMITTEES CARRY ON A.P.I. WORK

Numerous committees and subcommittees charged with the responsibility of solving many of the industry's practical problems reported progress at mid-year meeting in Tulsa. The above shows Committee on Standardization of Refinery Equipment at work. A. E. Pew, Jr., of the Sun Oil Company, at head of table, is chairman

I.P.A.A. and National Stripper Well Association Programs

The mid-year meeting of the Independent Petroleum Association of America will open at the Mayo Hotel, Tulsa, Thursday, May 21, and the National Stripper Well Association on Friday, May 22. Registrations have been received from all oil states.

The general meeting of the Independent Petroleum Association will open at 10 a.m. Thursday, with a report by Charles F. Roeser, president, followed by reports of the committee on cooperation with the Interstate Oil Compact Commission, H. B. Fell, chairman; report of domestic asphalt committee, L. H. Prichard, chairman; report of Royalty owners committee, R. S. Shade, chairman; report of legislative and public Relations committees, Charles F. Roeser, chairman; The Washington Situation, R. B. Brown, general counsel.

WILLIAM BELL
President, National Stripper Well Association

At 12:30 p.m. there will be the directors' luncheon and meeting; at 2 p.m., meeting of the executive committee; and at 6 p.m., reception for officers of the Independent Petroleum Association and the National Stripper Well Association.

The mid-year banquet held jointly by the Independent Petroleum Association and the National Stripper Well Association will be given at 7 p.m.; presiding officer being J. Wood Glass, president of the Northeastern Oklahoma Stripper Well Association, Nowata, Okla., and the toastmaster Charles F. Roeser, president, Independent Petroleum Association.

John M. Lovejoy, president, American Institute of Mining and Metallurgical Engineers, New York, will speak on "Some Economic Aspects of Proration."

The annual meeting of National Stripper Well Association will open at 10 a.m. Friday, May 22, with the reports of President William Bell, Robinson, Ill.; Executive Vice President H. B. Fell, Tulsa, and Secretary-Treasurer T. B. Steele, Robinson, Ill., followed by addresses on the Legislative Situation at Washington by R. B. Brown, general counsel, and by Charles F. Roeser, president, Independent Petroleum Association, on "The Future Possibilities for Stripper Wells with Particular Reference to the Economic Importance and Value of Stripper Wells."

At 2 p.m. there will be open discusssion on the subject of Mr. Roeser's address led by P. B. Flynn, North Texas Oil and Gas Association; Ray M. Collins, Tulsa, and W. W. Warner, Northeastern

Texas Allowable

AUSTIN, Tex., May 18.—The railroad commission has issued an order setting the allowable on production for Texas at 1,143,995 bbls. daily, effective May 20 and to continue through June, with such future adjustments as necessary. Allowable for the East Texas field has been set at 438,000 bbls. daily.

Events Being Shaped for Show Down on Rodessa Production Situation

By H. STANLEY NORMAN

SHREVEPORT, La., May 19.—Events are shaping themselves for something definite in the Rodessa area. As it is believed there will be increasing pressure from other operators unless the special allowable for Pelican Oil Co. wells is revoked it is expected Governor Leche will shortly take action.

All operators in Rodessa continued Tuesday producing only their regular allowable of 350 bbls. per day per well, excepting Pelican Oil & Gasoline Co.'s 13-well Sexton lease, which is reported slumping in rate of yield. Virtually wide open for a full week Tuesday, yield from the lease reached a peak of about 19,000 bbls., but was said Tuesday to have dropped to about 15,000 bbls. in 24 hours.

Meanwhile, Rodessa production had climbed to approximately 72,500 bbls. per day with the Pelican company's 13 wells supplying from 16,500 to 18,500 bbls. to the total.

Rumors are current the Pelican special order will be rescinded and the wells ordered curtailed to the regular allowable of 350 bbls. per day each, but up to Monday night no official action had been taken by the Louisiana Conservation Department. The activity of the Federal Tender Board at Kilgore in East Texas in seeking to halt the interstate movement of the Pelican production above its regular allowable was watched with interest by oil men. There remained considerable doubt whether the Federal Tender Board can exercise jurisdiction over the production which is being produced under a special order granted by the state Conservation Department.

Much speculation was also current as to how long the field's posted price of $1 per barrel will hold under existing conditions and how much longer other operators in the pools will keep a check on their wells.

All production from the Pelican lease, now operating under a special order issued March 24 by Dr. J. A. Shaw, director of the Louisiana Conservation Department, is being handled by Eastern Pipe Line Co., a Freeman W. Burford interest. About 6,000 bbls. daily of the 24,000 bbls. gathered by the Eastern Texas line is being batched through Texas-Empire Pipe Line Co.'s 12-inch trunk from East Texas to the Gulf Coast. Remainder of the 23,000 to 24,000 bbls. of oil daily handled from the Sexton lease by Eastern Texas pipe line facilities is being shipped by rail from Jefferson, Tex., to Good Hope, La. Eastern Texas is loading the oil over its facilities at Jefferson. A rail tariff of 5½ cents per barrel prevails from Jefferson to the Good Hope terminal.

Protests by oil men and land owners interested in the Rodessa pool and in other southwestern oil fields were directed to Governor Leche and to Bob Maestri, of the Louisiana Department of Conservation. Land owners and holders of royalty interests under leases offsetting the Pelican's Sexton property petitioned their operators to match barrel for barrel while awaiting action on protests filed with state officials.

Authentic, but unverified, reports were Pelican was producing a big portion of its daily extraction of 18,500 bbls. from five or six of the 13 wells on the 120-acre Sexton lease. One well on the middle 40 acres is exclusively a gasser and six or seven of the more southern wells are primarily gas producers making distillate. Flares from the lease while producing at the rate of 18,500 bbls. per day can be seen for miles. Smoke from the flares is black, indicating wells capable of producing only distillate with gas are yielding at rates incapable of separating all distillate from the gas.

During the first four days when the Pelican lease was opened wide last week, pressure on tubing and casing heads on surrounding offsets declined about 75 pounds and was gradually slipping lower as the high rate of production continued.

Fear was expressed by petroleum engineers irreparable damage has been done already to that portion of the Rodessa pool in which the Pelican lease is situated. The uncurbed rate of production is theorized by engineers to be pulling gas into the area from far down flanks of the structure and liberating it at a more rapid rate than oil is being displaced. Engineers forsee creation of a gas cap in this particular spot, which, combined with dissipation of natural pressure, will prevent normal and complete flushing of the oil reservoir. At the present rate of pressure decline, some oil men hope nature will soon take a hand in curbing the rate of production, but all agree this is not yet in sight.

It is estimated by field men from 125,000,000 to 150,000,000 feet of gas per day is being blown into the air and burned at the exhaust end of flares from the Pelican lease alone. At the production rate of 18,500 bbls. per day, the gas yield estimate of 150,000,000 feet per day from the Pelican lease is a ratio of about 8,000 feet of gas per barrel of oil.

Pool's Production

Production from the Rodessa pool, including about 14,500 bbls. per day above the normal allowable from the Pelican lease, averaged in excess of 70,000 bbls. daily at the end of last week. Normal completions during remainder of the month will make the regular allowable approximately equal to that figure by the end of May. If the Pelican properties are continued at their present rate of production, the Rodessa field's yield by the end of May probably will be nearer 90,000 bbls. daily.

Contentions of some Louisiana officials that the state has been discriminated against in federal agency production allocations appear unsubstantiated by the record which discloses the Planning and Coordination Committee and Bureau of Mines gradually increased their estimates for Louisiana demand more than 100,000 bbls. per day in three years. The May, 1936, allocation by the Bureau of Mines was 170,500 bbls. per day, whereas the state is actually producing more than 220,000 bbls. daily and temporarily, at least, the figure is nearer 240,000 bbls. daily.

In view of the fact Louisiana is now allocated more than 100,000 bbls. over its 1933 quota, in addition to exceeding the Bureau of Mines recommendation by approximately 50,000 bbls. per day,

RAILROAD GETS WELL, BUILDS NEW STATION

Along the Kansas City Southern's right of way from Kansas City to Port Arthur, Tex., probably the least useful thing until last July, says the Kansas City Star, was the extra 100-foot width to which the right of way widened where the railroad passed through the then sleepy Louisiana town of Rodessa.

That was before oil spurted in. There was some timber and a scratching of the soil for cotton, but Rodessa was so near the commercial zero as a village that the railroad years ago dismantled the station and hauled it away.

But it is because of Rodessa that the Kansas City Southern is an oil well owner, as well as beneficiary of the freight frontage arising in this oil-mad mushroom city of about 5,000, a little Oklahoma City with its backyard derricks.

For Rodessa the grateful Kansas City Southern is about to build a modern, permanent station. It will differ from other modern railroad stations in thriving towns chiefly in that the station semaphore will be designed in the form of a derrick.

From a temporary station made up of box cars, the Kansas City Southern grossed $124,000 in freight business in March, and the tonnage is increasing each month.

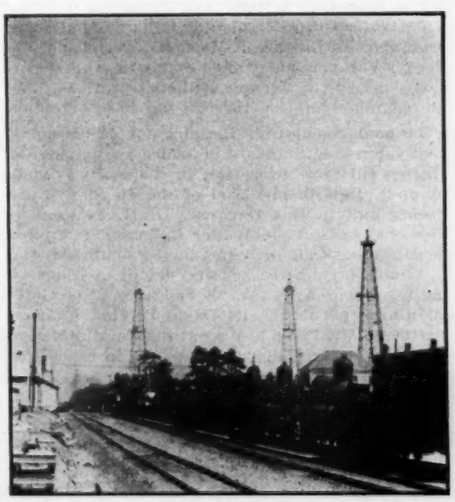
The railroad also has an oil well of its own and the right of way may afford from six to eight other wells of equal potentiality.

Railroad rights of way usually are surface easements only and may not be perforated for oil. But back in the years before Rodessa became such a commercial washout the railroad bought outright a 50-foot strip on either side of its 100-foot right of way through the townsite. It is on the tip of this fee-owned land that the railroad's 30,000-bbl. well was brought in.

Charles E. Johnston, Kansas City Southern president, said the value of this narrow strip of right of way oil land was just a guess. A total of six or eight wells can be sunk, depending on where the fault line crosses the railroad tracks.

"Our extra width right of way is not for sale," President Johnston says, contemplating an added net income. With 510,000 shares outstanding, the oil well gain could not add materially to the railroad value, certainly not so much as the stock occasionally has fluctuated up and down.

While oil royalties are net and freight charges have to be earned, the Kansas City Southern has a substantial freight income ahead from Rodessa's good luck—and from the nearby little "dessas," for now there is a "Westdessa," an "Eastdessa" and other tags on that magic name.



K.C.S. right of way through Rodessa

many oil men believe Louisiana is getting its share or more of the current market demand.

Meanwhile East Texas Refining Co. prepared to appeal to the federal circuit court from Judge Bryant's decision that 5,272 bbls. of gasoline refined and stored at Longview, Tex., must have federal clearance certificates. The crude was produced on the Louisiana side of Rodessa field.

Judge Bryant denied the application of the refining company and East Texas Pipe Line Co. for an injunction to prevent federal tender board No. 1 from requiring clearance certificates. If the products were moved into the area in which federal tender board No. 1 has control, Judge Bryant said they were subject to the board's jurisdiction and required clearance papers. He said, however, that oil produced in Rodessa and moved in continuous shipments to points outside of Texas was not subject to the board's control.

Federal Action

The federal government Saturday filed a petition in federal district court at Sherman, Tex., seeking to block the movement of 71,374 bbls. of Rodessa crude from East Texas, alleged contraband under the Connally act. Judge Randolph Bryant set a hearing in Sherman upon merits for May 21.

The petition sought temporary restraining orders against Texas Co., Texas Empire Pipe Line Co., Tide Water Oil Co., East Texas Refining Co. and East Texas Pipe Line Co. Counsel of the companies agreed to impound the oil to facilitate the hearing.

Tide Water Oil Co. Statement on Rodessa Oil Purchases

In view of the published articles and rumors involving Rodessa crude produced under a special proration order, the following statement has been obtained from the Tide Water Oil Co. as to its position in this matter:

"East Texas Refining Co., on March 19, 1936, offered to sell Rodessa crude to Tide Water. On that date the only order in effect in the Rodessa field was the general order issued by the Louisiana Department of Conservation. Tide Water contracted to purchase for delivery to its tanks in East Texas, 500,000 bbls. of Rodessa crude at the regular market price plus a transportation charge. This contract was effective March 25, 1936, and required that all deliveries should be covered by proper state and federal tenders. Tide Water was under the distinct impression the oil it was purchasing would be produced under the general Rodessa proration orders.

"Although the special order with reference to Pelican's production had apparently been made on March 24, 1936, Tide Water had no knowledge or information regarding such an order prior to April 2, when the East Texas Refining Co. applied for a tender before the Federal Tender Board at Kilgore.

"Tide Water refused to accept any Rodessa crude until covered by federal tenders. No federal tenders were obtained, but on April 11, Federal Judge Randolph Bryant issued an order in which it was stated, in substance, that the Federal Tender Board admitted it had no jurisdiction over Rodessa crude oil moving through the East Texas oil field in interstate commerce. The East Texas Refining Co. served Tide Water with a certified copy of this order and insisted Tide Water accept oil under the contract.

"Tide Water commenced receiving oil on April 15 and deliveries were continued from that date until May 10. During that period, deliveries did not at any time exceed the cumulative daily allowable under the general field orders for the leases to which the East Texas Pipe Line Co. was connected. No deliveries of Rodessa crude have been made to Tide Water since Pelican reopened its wells under the special order.

"The agreement referred to is the only agreement between Tide Water and East Texas Refining Co. or any of its affiliated companies for the purchase or delivery of Rodessa oil.

"Tide Water has not purchased, nor has it ever negotiated for the purchase of, Rodessa crude oil moved via tankcars."

Crude Oil Production Peak Is 3,005,400 Bbls. Daily

All crude oil production records in the United States were broken in the past week with an average of 3,005,440 bbls. per day. The previous peak came in the week of August 23, 1929, with 2,975,435 bbls. per day.

PRODUCTION IN THE UNITED STATES

	Week Ending New high, May 16, 1936	Previous high, Aug. 23, 1929	Change
Oklahoma City	155,400	36,580	+118,820
Seminole-St. Louis	105,225	372,425	—267,200
Remainder of state	299,900	318,005	—18,105
Total Oklahoma	560,525	727,010	—166,485
East Texas	455,197		+455,197
West Texas	185,137	377,154	—192,017
North Central Texas	85,250	156,853	—71,603
Texas Panhandle	63,032	133,624	—70,592
East Central Texas	55,336	18,744	+36,592
Gulf Coast—Texas	254,792	141,759	+113,033
Southwest Texas	81,387	74,386	+7,001
Total Texas	1,180,131	902,520	+277,611
North Louisiana	82,535	36,440	+46,095
Gulf Coast—Louisiana	144,150	21,182	+122,968
Total Louisiana	226,685	57,622	+169,063
Santa Fe Springs	45,000	295,500	—250,500
Long Beach	68,000	170,000	—102,000
Mountain View	28,200		+28,200
Kettleman Hills	80,000	5,300	+74,700
Remainder of state	360,600	417,700	—57,100
Total California	581,800	888,500	—306,700
Kansas	160,500	128,340	+32,160
Arkansas	29,960	66,680	—36,720
Eastern fields	108,200	126,000	—17,800
Michigan	34,899	(*)	+34,899
Rocky Mountain area	122,740	78,763	+43,977
Total United States	3,005,440	2,975,435	+30,005

*Michigan included in Eastern fields in 1929.

Thompson Phones Leche

AUSTIN, Tex., May 18.—Chairman E. O. Thompson, of the Railroad Commission, has suggested to Governor Richard Leche of Louisiana, that a joint hearing be held at Marshall, June 3 or June 5 to consider proration of Rodessa.

Chairman Thompson later called Governor Leche and urged an early hearing and the governor asked, "Is there any physical waste going on at Rodessa?" Colonel Thompson replied: "That would be determined by the testimony and facts brought out in a joint hearing."

Governor Leche commented: "That sounds reasonable and I will get hold of our commission and see if we cannot arrange it and will let you know."

New Decision on Spacing

AUSTIN, Tex., May 18.—Empire Gas & Fuel Co. won in a controversy with the railroad commission over an exception to Rule 37 on well spacing. The third court of civil appeals reversed a district court ruling in favor of the commission and ordered a new trial.

The exception had been granted to Shilo Oil Co. for a second well on 2.75-acre tract in Gregg County with one well already in the center of the tract. The court held evidence of recovery from larger tracts in the vicinity should have been admitted to aid in determining if Shilo was recovering its fair share of the oil in place.

The opinion also held that Gulf Production Co. should have been permitted to intervene as a party interested. The Gulf company had been excluded because its property, though within 430 feet, did not adjoin the tract. The opinion gave recognition to the Supreme Court's holding in Brown vs. Humble that an operator is entitled to a "fair share" of the oil in place.

Adjacent high density drilling was held not a valid reason to further extend it is an exception to the rule.

Magnetic Storm

Tucson, Ariz., observatory of the U. S. Coast and Geodetic Survey advise that moderate magnetic storm started at 2 a.m. (C.S.T.) May 10 and ended May 12 at 7 p.m. (C.S.T.)

Gulf Purchase in Rodessa Area Enlarges Holdings of Majors

SHREVEPORT, La., May 19.—Announcement that Gulf Refining Co. of Delaware has acquired half of the Standard Oil Co. of Louisiana properties in the Rodessa pool leaves only Stanolind Oil & Gas Co., Atlantic Oil Producing Co. and Tide Water Oil Co. as the big units without representation in the area. Magnolia Petroleum Co., Socony-Vacuum unit, and Standard Oil Co. of Louisiana, New Jersey affiliate, previously acquired representation through purchase or option.

Announcement Gulf Refining Co. has acquired half interest in Standard of Louisiana purchase of Haynes Oil Corp. properties in Rodessa was made by J. R. McWilliams, head of the Standard's producing unit in this territory. H. H. Johnson, of Houston, assistant to Walter B. Pyron, vice president heading Gulf activities in the southwest, was in Shreveport all week closing details. Accompanying Mr. Johnson was A. M. Smith, head of Gulf's auditing department, and David Proctor, legal department. Mr. Pyron also spent the week in Shreveport, but declared his visit was not in connection with the Standard Gulf deal.

Probably the two outstanding properties that attract buying interest in Rodessa are Pelican Oil & Gasoline Co., and United Gas Public Service Co., the major producing concern at Rodessa. Consideration for Gulf's 50 per cent participation in Standard of Louisiana's purchase of the Haynes properties was not announced, but it was generally believed Gulf figured in negotiations from the start—meaning the company "got in" at the same price paid by Standard of Louisiana, estimated by some in the neighborhood of $15,000,000.

Atlantic Oil Producing Co. with a pipe line survey completed from East Texas to Rodessa is the most logical of the big units to make the next buying move. However, the company has not exercised its privilege of building on the pipe line right-of-way, which has led some to speculate the company will acquire facilities of the Eastern Texas Pipe Line Co. The Eastern Texas line closely parallels the survey made by Atlantic, but no duplication of facilities has been attempted.

United Gas Public Service Co., an offspring of the old Moody-Seagraves Corp., is primarily a gas producing and gas distributing concern with no oil line or refining facilities immediately available to Rodessa. Although Rodessa crude in itself produces an inferior quality of gasoline (about 39 octane without blending or mixture) is highly adaptable to manufacture of kerosene and naphthas.

For the reason raw Rodessa crude is inferior for gasoline without better material with which it may be blended, companies without other raw material for mixture are at a disadvantage. One of the Shreveport territory's leading refiners declares his company can obtain no better than 58 octane rating by blending 50 per cent East Texas and 50 per cent Rodessa crude. The company is equipped with the most modern refining facilities.

I.P.T. Is Told Future Geological Data to Be Secured by Exploratory Wells

Consul Hermann von Rautenkranz and Hary von Rautenkranz, Celli-Hanover, Germany

The oil industry will shortly enter a period in which it will be necessary to drill a large number of exploratory wells to obtain the necessary geological data which will make possible the finding of new oil reserves, E. L. De Golyer, widely known geologist and operator, told members and guests of the Institution of Petroleum Technologists (London) in Tulsa Thursday evening, May 15.

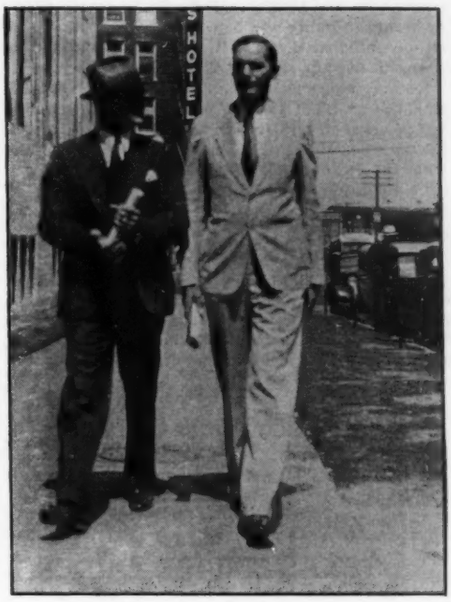
Mr. De Golyer, in reviewing the history of efforts to find new fields, said in a few years all structural accumulations of oil which can be located by geophysical methods will have been found and it will be necessary to adopt other methods to locate oil in other types of accumulations. This will necessitate a more detailed study of subsurface formations for correlating data and this will mean the drilling of many exploratory wells. These tests will be drilled with special care to obtain accurate data. Mr. De Golyer said this procedure of drilling exploratory wells will be similar to the original method in opening fields by wildcatting without geological advice, excepting that future wildcats will be located only after every geological technique has been applied to aid in the work. As these future control wildcat wells are drilled samples of the formations will be carefully examined in laboratories and the data correlated so regional conditions may be studied.

Approximately 75 members and guests of the institution attended the dinner which was its first American meeting. Several representatives of foreign companies who were in Tulsa attending the meetings of the American Petroleum Institute and International Petroleum Exposition attended the dinner at which Dr. C. K. Francis, technical editor of The Oil and Gas Journal, presided as toastmaster. Mr. De Golyer, and Dr. Gustav Egloff, who reviewed developments in the refining industry over 25 years, were introduced by Dr. T. G. Delbridge, head of the development department of Atlantic Refining Co., a member of the institution.

Doctor Egloff referred to the remarkable advancement during 25 years in chemistry and petroleum technology. When the automobile required a fuel it was found since the crude varied in quality the resulting gasoline, made by the skimming method, was by no means a uniform product. The chemist has found means for bringing it to a high grade of purity and the cracking process has furnished gasoline in great quantities. Had it not been for cracked gasoline the motorist would be required to pay much more for his fuel.

The technologist has discovered gum and color inhibitors, so gum does not form in the gasoline and good color is retained. The knock inhibitors are being replaced by knockless fuel made by polymerization methods. Greater speeds and very rapid startings are possibilities of fuels now made. One hundred octane fuels are available, and are being used by aircraft, and 150 octane gasolines are in sight.

The chemists are now looking into possibilities of molecular selection. The cracking process tore the large molecule apart. The act of polymerization unites small parts, such as gases, to make larger units, liquids. The progress of investigations are encouraging enough to feel the day may not be far distant when the refiner will be prepared to furnish his products according to molecular specifications.



Marshall Brown, Venezuela Gulf Oil Co., Maracaibo, Venezuela, and Joe A. Holmes, Standard Oil Co. of Venezuela, Caripito

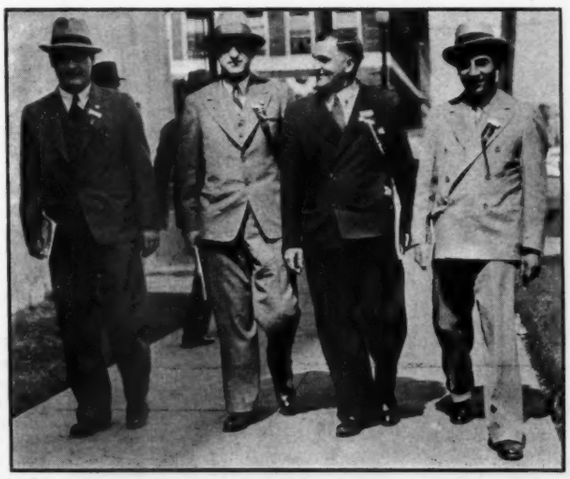
President J. M. Lovejoy Attends Mid-Continent A.I.M.E.

The Mid-Continent section of the American Institute of Mining Engineers was fortunate in having as guest the recently elected president of the Institute, John M. Lovejoy, of New York City and formerly a resident of Tulsa. Mr. Lovejoy made a brief talk, and stated that the increase in membership in the Institute is most gratifying. About 8,000 engineers and others belong to this society now, of which about 1,200 are connected with the petroleum industry in some capacity. This makes this division one of the strongest within the Institute and as Mr. Lovejoy is directly identified with the oil industry his presidency this year is most gratifying to this group.

Mr. Lovejoy pointed out the many opportunities for engineers now rapidly developing with the increased activity in all branches of industry. Not only are all newly graduated engineers finding employment as quickly as they leave college but there are actually many places vacant because specially trained men capable of filling them are not available. With increased activity the demand for specialists in all engineering branches becomes greater and this is now becoming quite apparent through surveys conducted by members of the Institute in New York and other centers in this country.

Mr. Lovejoy introduced the principal speaker, C. H. Lieb, president, Carter Oil Co., Tulsa, who chose for his topic, "Economics of Oil Producing Practice."

Of special interest to the members of the Petroleum Division of the Institute is the recently created Anthony F. Lucas memorial. Mr. Lovejoy is chairman of the committee appointed to draw up a detailed plan for establishment of the medal and any other awards that seem desirable. It is proposed to make award from time to time to petroleum engineers for outstanding contributions to the art of finding and producing oil and gas. Mr. Lovejoy outlined the work of Captain Lucas and the hopes of the Institute board of directors in authorizing this special award in his memory.



F. Fedorov, Grosni, Russia; E. Ginsburg, Batoum, Russia; A. Iskanderov, Baku, U.S.S.R.; M. B. Markovitch, professor, Chemico-Technological Institute, Leningrad.

Drop in Pressure

SHREVEPORT, La., May 19.—With the high production from 13 Louisiana wells, bottom-hole pressure tests are reported to have shown a sharp drop. A decline of about 100 pounds in two months was compared to a drop of about 10 pounds in East Texas during six months.

Observers in the field also reported gas wastage of 300,000,000 feet daily, due to a high ratio of gas to oil, combined with overproduction to cause the reservoir pressure decline.

Pipe Line Activity

Michigan Gas Line Extension

MUSKEGON, Mich., May 18.—Michigan Public Utilities Commission has ordered a hearing Thursday, May 28, in Lansing on a proposed extension of the American-Michigan pipe line serving Greater Muskegon with natural gas. A petition of the Aetna Pipe Line Co. to lay several miles of pipe to connect the Austin and Aetna Township fields of Mecosta County will be considered with no opposition anticipated. It will add several wells in Aetna Township to the Austin reserves.

At the same hearing application of the Grand Rapids Gas Light Co. for permission to distribute 100 per cent natural gas in Grand Rapids through the 50-mile, 10-inch line now under construction from the tri-townships filed of Mecosta and Montcalm Counties also will be considered.

Refugio-Placedo Line

HOUSTON, Tex., May 18.—Humble Pipe Line Co. is to extend its line from the Tom O'Connor field in Refugio County to the Placedo field, in Southwest Texas, a result of the discovery of oil on the Patrick H. Welder ranch in Calhoun County.

N. Y. - Pennsylvania Gas Line

ROCHESTER, N. Y., May 18.—Announcement that Rochester's largest industrial concern, Eastman Kodak Co., had contracted for a natural gas supply pipe direct from Pennsylvania fields raised threats of a fight before the Public Service Commission by Rochester Gas & Electric Corp. to keep the proposed line outside the city's limits.

The kodak company's line, according to Frank J. Lovejoy, president and general manager, will not enter the city proper. Nevertheless officials of the utility said they were ready to fight any encroachment.

Godfrey L. Cabot, Inc., of Boston and a subsidiary concern, will supply the gas and already have acquired options to right of way. Kodak officials said the Cabot firm is soliciting other industries along the route as customers.

The Rochester Gas & Electric Corp.'s franchise does not give it exclusive rights of supplying gas here, but competition would require approval of the Public Service Commission. In the outlying districts approval of town boards is necessary.

The pipe line probably will be completed by fall. A little more than 100 miles of 14-inch pipe line will be run from a northern Pennsylvania field owned by the Cabot Gas Corp. of Olean, a subsidiary of the Godfrey Cabot Corp.

A 100-Mile Montana Line

GREAT FALLS, Mont., May 18.—The Home Oil & Refining Co. announces negotiations completed for construction of a $675,000, 100-mile pipe line linking its refinery in Great Falls with Pondera and Cut Bank oil fields. The statement said the refinery would purchase 3,500,000 bbls. of Cut Bank crude as part of the project. The plant here was modernized recently at a cost of $250,000.

Kansas Gathering Line

Stanolind Pipe Line Co. will build a pipe line from the Gates pool of Stafford County, Kansas, to the new Hiss pool south of Great Bend, a distance of 6 miles, either a 4 or 6-inch welded line, with completion scheduled for about May 25.

Stringing Pipe

C. Hobson Dunn, Dallas, Tex., is stringing pipe in Kansas on the Northern Natural Gas line and in Indiana and Ohio on the Michigan Transmission Corp. gas line. He will start a job next week in Pennsylvania.

Zapata Pipe Line

AUSTIN, Tex., May 18.—Charter has been issued to Zapata Pipe Line Co., Austin, to transport mineral solutions; capital stock $9,000. Incorporators: Norman Brown, James P. Nash and Leslie McKay.

TEXAS-EMPIRE ORDERS LOOPS AND NEW LINE

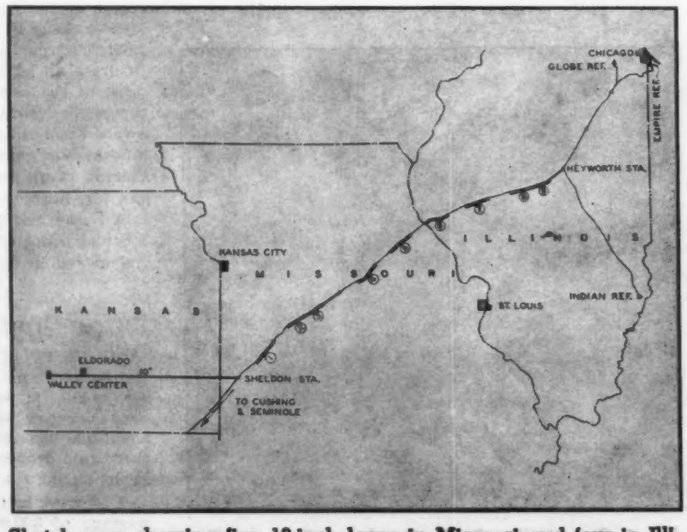
Continuing a policy started last fall to give additional outlet to the crude oil produced in the western part of Kansas the Texas-Empire Pipe Line Co. has announced the authorization of the expenditure of about $4,500,000 to cover cost of looping the main trunk line through Missouri and Illinois and the building of a 10-inch pipe line between El Dorado, Kansas and Sheldon, Mo.

The Kaw Pipe Line Co. jointly owned by the Texas Co., the Empire Pipe Line Co. and Phillips Petroleum Co., which has a working agreement with the White Eagle Pipe Line Co. is gathering and transporting about 30,000 bbls. of oil daily in west central Kansas. This oil is transported through Valley Center to the refinery at El Dorado, Kans., and the new 10-inch line will connect the Valley Center terminal with the company's trunk line at Sheldon, Mo., a point almost 100 miles due east of El Dorado, Kans.

Heretofore any oil entering the Texas-Empire Pipe Line system for transportation to Chicago and other eastern points has been first pumped from Valley Center, Kans., south to Yale, Okla., a distance of about 150 miles and then northward about an equal distance to Sheldon station. With the new direct connection between Valley Center and Sheldon stations about 250 miles of transportation of this oil will be eliminated and the saving in cost and time will justify this expenditure for this new pipe line. It will be 10-inch new steel welded pipe throughout with adequate pumping station facilities provided to handle at least 20,000 bbls. of oil daily.

The other improvement authorized is the looping of the main line with nine 12-inch loops between Sheldon, Mo., and Heyworth, Ill. Five of these loops will be in Missouri and four in Illinois and it is estimated the additional capacity of the system will be not less than 18,000 bbls. daily when they are completed. This will increase the capacity of the main trunk line system of Texas-Empire Pipe Line Co. to about 90,000 bbls. of oil daily.

The Texas-Empire pipe line is one of the major transportation systems connecting to Mid-Continent fields. It supplies crude oil for the East Chicago, Ind., refinery of the Empire Oil & Refining Co. and the Lockport, Ill., refinery of the Texas Co. and through a connecting line to the Indian Refining Co. (Texas) refinery at Lawrenceville, Ill. Tendered oil is also delivered to the Lemont, Ill., refinery of the Globe Oil & Refining Co. The line going to Lawrenceville also connects to the western terminus of the Tide Water Pipe Line Co.



Sketch map showing five 12-inch loops in Missouri and four in Illinois, to be made on main line, and new 10-inch line of Texas-Empire Co. from Valley Center, Kans., to Sheldon, Mo.

Refinery Projects

Rehabilitating Louisiana Plants

SHREVEPORT, La., May 18.—An active program for participation in all phases of the oil business vital to its membership has been mapped for the fiscal year by the Louisiana-Arkansas Refiners Association. Pleas O. Hardwick, sales manager, Atlas Oil Corp., Shreveport, has been elected president; J. A. Welch, Louisiana Oil Refining Corp., first vice president; Horace Canon, Root Petroleum Co., second vice president; E. F. Brakefield, Louisiana Oil Refining Corp., treasurer, and L. C. Grosjean was reelected secretary.

The new board consists of D. W. Harris, Louisiana Oil Refining Corp.; T. H. Barton, Lion Oil Refining Co.; D. P. Hamilton, Root Petroleum Co.; B. H. Gray, Atlas Pipe Line Corp.; M. J. Grogan, Rodessa Oil & Refining Corp.; George F. Fox, Henry H. Cross Co.; W. B. Hassett, Stephens Refining Co.; D. B. Williams, Chalmette Petroleum Corp.; S. M. Batterson, Macmillan Petroleum Corp.; H. B. Pullar, Barry Asphalt Co.; E. F. Griswold, Griswold Refining Co., and P. M. Brown, Bayou State Oil Corp. The executive committee is headed by President Hardwick and includes Vice Presidents Ward and Canon, T. M. Martin, Lion Refining Co., and Mr. Grogan.

R. B. Pierce, Louisiana Oil Refining Corp., is chairman of the manufacturing committee, other members being R. T. Colquette, Root Petroleum Co., and J. J. Allisnon of Lion company. Mr. Canon of the finance and budget committee, with Messrs. Harris and Gray serving as members.

The membership committee is headed by D. A. Brown, Root Petroleum Co., with Mr. Martin of the Lion company and H. G. Williams of the Chelmette Petroleum Corp. the other members. Rise of Louisiana to the fourth largest producing state of crude has increased its importance in the refining picture. With crude accessible to several outmoded or inactive plants in North Louisiana, millions have been spent or are being spent for rehabilitation. Several plants content to operate on limited supplies of raw material with antiquated equipment are being modernized by installation of latest reforming and cracking facilities.

New Michigan Refinery

MUSKEGON, Mich., May 16.—Ground will be broken soon for erection of a new refinery at Grand Haven, Mich., about 12 miles south of Muskegon.

Officials of Petroleum Chemicals Co., Inc., last week inspected an 11-acre site recently acquired from the Grand Trunk Western Railway. About $700,000 will be spent for the plant. Chief products are to be ethylene-dichloride, propyl and Butyl alcohols and grain alcohol. J. W. Hurley, head of Hurley Brothers, petroleum engineers at Tulsa,

Okla., will build the plant to plans and specifications prepared by Gerald W. Wagner, Grand Rapids, consulting engineer.

Construction of the new 1,500-bbl. skimming plant of Producers Refining, Inc., at West Branch, Ogemaw County, is being rushed to completion. Storage tanks are being filled with oil run through a new 6-pipe line 6½ miles long. The plant is expected to go on stream before the close of May.

Rapid growth in the demand for its products has led officials of the American Petro-Chemical Co., Wayne, Mich., to place the second of its three cracking and reforming units into operation.

Inter Lakes Refining Co., operating a 1,000-bbl. cracking plant at Trenton, Mich., recently started test runs. It is the fourth independent Michigan plant to install a cracking unit.

Texas Obtains Treating License

The Stratford Development Corp., exclusive licensor of the Stratford contractor-centrifuge-cold treatment process, reports that the Texas Co. has recently acquired a license for the installation of a cold acid treating plant having a capacity of 5,000 bbls. per day.

New Refinery Laboratory

PETROLIA, Ontario, May 16.—The inspection laboratory of Canadian Oil Refineries, Ltd., has been transferred to the recently completed new office building on Tank Street. E. A. Smith is chief chemist.

Natural Gasoline

California Spot Market Light

LOS ANGELES, Calif., May 18.—Several California operators may find it necessary to import additional natural gasoline from Oklahoma and the Gulf Coast into Pacific Coast territory within the next 60 days unless the existing situation in California is alleviated in the near future. The Exeter Oil Co. has already placed an order for several carloads and the Richfield Oil Co. has bought a cargo of approximately 80,000 bbls. of natural gasoline to be lifted in the Gulf Coast. The Exeter Oil Co. will fill its temporary needs by bringing in natural gasoline by rail but is seriously considering the advisability of bringing in 10,000 or 15,000 bbls. by water if present conditions continue in California.

Based on Group 3 price of approximately 3 cents, this natural gasoline could be laid down in Los Angeles at about 8 cents per gallon by rail. This is substantially higher than existing prices in California, but paradoxical as it may seem there is very little natural gasoline that can be picked up in the spot market as most of it has been placed under contract within the past several weeks. This tends to indicate that California quotations on natural gasoline will reach higher levels in the immediate future but since practically all of it is under contract the prices may be nominal in character and not indicative of actual purchases and sales. Several of the major companies have substantial quantities in storage, and while rather reluctant to reduce natural gasoline stocks in view of existing conditions may come to the aid of the smaller refiners who require the natural for blending.

Production of natural gasoline in California at the present time is substantially lower than during the latter part of last year, due primarily to curtailment work in the Kettleman North Dome. During March of this year plant operators produced 46,843,000 gallons of natural gasoline in California fields, whereas in December production was 52,244,000 gallons.

Marketing conditions in California are in exceptionally good shape and indications point to the probability that present favorable conditions will prevail for the next several months. Although periodic fluctuations from time to time may be expected, the general price range should be narrow if marketers adhere to the marketing code and continue to accept gasoline from the Independent Refiners Association. Crude oil production is considerably higher than some would like, but at the same time there is no great amount available in the spot market. All marketers feel that crude will be less plentiful next year and are accordingly making long term contracts with crude oil producers. This action has taken a considerable amount of crude off the general market and has at the same time strengthened prices.

Bureau of Mines March Report

The production of natural gasoline continued to decline in March, according to a report prepared by the Bureau of Mines, the daily average in March being 4,577,000 gallons compared with an average of 4,629,000 gallons daily in February. The daily average production in the Panhandle, which declined 21 per cent in February from January, showed a further decline of 8 per cent. The next most important field, Kettleman Hills, also registered a decrease in daily average output in March. Production in the Oklahoma City field for March was 11,227,000 gallons as compared with a total production of 11,078,000 gallons in February, an increase of 1.4 per cent. Production during the month, by districts, was as follows: Appalachian, 6,264,000 gallons; Illinois, Kentucky and Michigan, 910,000; Oklahoma, 34,636,000; Kansas, 2,767,000; Texas 40,430,000; Louisiana 4,139,000; Arkansas 1,070,000; Rocky Mountain, 5,061,000; and California 46,593,00. Total production for the month was 141,876,000 gallons as compared with 134,232,000 gallons in February. Total production of the first quarter of 1936 was 429,534,000 gallons as compared with 397,387,000 gallons for a like period of 1935.

Stocks of natural gasoline increased from 177,156,000 gallons on hand the first of the month to 191,226,000 gallons on hand March 31. All of the increase was recorded in stocks at plants and terminals, stocks at refineries showing a small decline; from 100,170,000 gallons on March 1 to 100,002,000 gallons on March 31. The increased stocks were fairly well distributed throughout the United States with Texas plants and terminals showing the greatest increase; from 48,589,000 gallons to 54,492,000 gallons.

Direct sales of natural gasoline declined in February as compared with March. The total of exports and sales to jobbers and retailers for March was 16,061,000 gallons, equivalent to 13 per cent of all deliveries.

The average vapor pressure of the major movements of natural gasoline declined in March. As this marks the first time in several months that there has been a general decrease in vapor pressures, indications point to the beginning of the seasonal decline in such pressures, that is, to the manufacture of natural gasoline of decreasing volatility.

Natural Gas News

Southwestern Gas Measurement

The twelfth Southwestern Gas Measurement Short Course, held at the University of Oklahoma, Norman, Okla., had an attendance of 506. The representatives came from 23 states and three foreign countries.

A report of interest was made by Ray Roundtree of the United Gas Public Service Co., Houston, Tex., on the work covered during the past year by the Committee for the Study of Practical Methods. Max Watson, chairman of the Publication Committee, has announced the proceedings of this year's short course will be published in bulletin form.

Much interest is being shown in the prize contest on "What I learned at the 1936 Meter School." There are seven prizes for the best reports, first $15; second, $10; and five $5 prizes. Those who wrote prize papers last year were: First prize, M. R. Howell, Coltexo Corp., Lefors, Tex.; second prize, Sidney H. Smith, Jr., Lone Star Gas Co., Breckenridge, Tex.; third prizes, Roy W. Parker, Oklahoma Natural Gas Co., Tulsa; Arthur F. Cox, Amarillo Oil Co., Amarillo, Tex.; L. F. Carter, Colorado Interstate Gas Co., Colorado Springs, Colorado; F. G. Brinson, Mid-Continent Petroleum Co., Tulsa; Earl H. Thompson, Socony-Vacuum Oil Co., Augusta, Kans.

E. E. Stovall, Lone Star Gas Co., Dallas, Tex., chairman of the program committee for this year's course, was elected general chairman for 1937. R. D. Turner, who was general chairman for 1936, was retired from active membership in the general committee as an ex-officio member. This plan of retirement was adopted several years ago so the personnel of the general committee would change and new members be admitted. W. H. Carson, director of the School of Natural Gas Engineering, University of Oklahoma, has been reelected secretary and treasurer for the ensuing year.

Texas Gas Allowable

AUSTIN, Tex., May 18.—The Railroad Commission today reduced the state allowable gas production for June about 11,000,000 feet daily in accordance with seasonal demand.

R. W. HENDEE LEAVES OKLAHOMA NATURAL

Robert W. Hendee has announced his resignation as president of Oklahoma Natural Gas Co., effective June 1, to accept an executive position with the Colorado Interstate Gas Co., affiliated with Standard Oil Co. (New Jersey), and having its main office in Colorado Springs, Colo., and maintaining more than 700 miles of pipe lines from the Panhandle field of Northwest Texas to Pueblo, Colorado Springs, Denver and other Colorado cities. Mr. Hendee said the board of directors has not as yet selected his successor.

In announcing his resignation, Mr. Hendee said: "It is needless for me to say that it is with a heavy heart I separate from my coworkers in the Oklahoma Natural. I have been in close and intimate association with practically all of the 700 employes during the past 15 years. I acknowledge their loyalty to me as chief executive of the company and they know of my genuine affection for each and every one of them."

A. E. Bradshaw, chairman of the board of directors of Oklahoma Natural Gas Co., said: "It has been a real pleasure to serve with Mr. Hendee on the board of directors of the company. His long experience as an officer of the company and knowledge of its affairs, as well as the great confidence the people of Oklahoma have in him, make it no easy matter to select his successor as president of the Oklahoma Natural."

Potential Advantages of Volatile Fuel Discussed Before N.G.A.A. Meeting

By D. H. STORMONT

Trends in motor fuel volatility, their immediate effects on automative design and performance, and potential advantages that could be gained through the use of more volatile fuels in suitably designed engines were the outstanding topics of discussion at the technical sessions of the fifteenth annual convention of the Natural Gasoline Association of America held in Tulsa last week. Many outstanding papers were presented at the sessions all of which were well attended.

One very interesting paper delivered was "Ten Years of Research" by Dr. G. G. Brown, professor of chemical engineering at the University of Michigan and director of the association's research program. In his paper Doctor Brown reviewed the research work done to determine the advantages that could be gained through the use of more volatile motor fuels. He stated that although there has been little improvement in motor cars in so far as freedom from vapor lock is concerned, and the average Reid vapor pressure for motor fuel has increased less than 1 pound since 1929, there has been a noticeable decrease in mixture temperatures to take advantage of the increased motor fuel volatility so as to obtain increased power and acceleration of the car. To 1935 this drop has amounted to about 35° F., which is sufficient to cause an increase in acceleration and power of about 9 per cent.

Mixture Temperatures

In viewing the future operating conditions of motor cars he stated that in order to secure further reduction in mixture temperatures and corresponding increase in power, it is necessary that the volatility of the average available motor fuel be still further increased. For fuels much more volatile than the present average, each decrease in mixture temperature of 1° F. will require a decrease in the 50 per cent point of almost 2° F. for equivalent performance.

"Automobile manufacturers have and apparently will take full advantage of increased total volatility as it is made generally available. To date, however, they have unfortunately failed to show a willingness or ability to increase the vapor pressure tolerance of the fuel used. There are, however, developments under way which may reduce the occurrence of vapor lock in the fuel line so as to allow an increase in vapor pressure of 3 or 4 pounds. But this will still leave the carburetor itself vulnerable to vapor lock if exposed to high temperatures."

Following the presentation of Doctor Brown's paper, two papers on the use of more volatile motor fuels, as viewed by the automotive industry, were presented by Wheeler C. Lovell, General Motors Corp., and Gilbert Way, of Chrysler Corp. These two papers were received with great interest by the largest attended session of the meeting. Following the presentation of the papers considerable discussion took place from the floor with several well known petroleum technologists expressing their views as to the future motor fuels and automobiles.

Mr. Lovell, in discussing advantages that could be derived from the use of more volatile motor fuels, pointed out that there were several limitations. The first limitation, he stated, had to do with how far one could go in reducing mixture temperatures; this step being necessary to the utilization of more volatile fuels. His belief was that from a strictly engineering standpoint the mixture temperature might be reduced approximately 60° F. with the result of obtaining a considerable increase in engine performance, acceleration and top speed. However, to do so would necessitate the installation of a thermostat to control the fuel temperature due to the wide variance in atmospheric temperatures and altitudes under which cars operate.

The second limitation to the satisfactory adoption of more volatile fuels was that the motor fuels of today vary greatly in volatility. Therefore to use these volatile fuels would involve the installation of a volatility controller for use in heating less volatile motor fuels.

In conclusion Mr. Lovell stated that due to atmospheric variations which cut down the maximum theoretical utilization of the potential value of more volatile motor fuels and due to variations in gasolines commercially available which practically limit the advancement to the least volatile fuel because of the lack of suitable widespread designation of gasolines with respect to volatility, serious limitations are offered.

"The success of the automobile is largely due to overcoming the inherent handicaps due to the necessity of operating with changing temperature, altitude and fuels. We cannot do much about the weather and elevation; but perhaps something can be done to secure more uniform fuels, or classification of fuels, so that we may take better advantage of their potential values."

In his paper, "Fuel Volatility as Viewed by the Automotive Engineer," Mr. Way explained the viewpoint of the automotive industry in regard to the rising trend in fuel volatility. He stated that in the endeavor to improve fuel handling conditions the engineer was none too happy with the present trend toward narrow streamlined hoods and the resulting lack of ventilation. Vapor lock and other troubles resulting from the use of volatile fuels, such as increased vapor losses and the accompanying greater fire hazard, and the formation of ice in the carburetor were also discussed.

"Specifically, we have first the increased vapor losses and accompanying greater fire hazard that would result from the use of these fuels when used in warm weather. An undesirable feature in this connection is the passing out of the lighter fractions through the gasoline tank and carburetor bowl vents. This action results in a reduction of the highest antiknock portions of the gasoline and also in a loss of a part of the fuel purchased by the motorist."

"Another undesirable limitation is the ice formation in the carburetor which was experienced in Doctor Brown's research work, making it necessary to heat the fuel to 110° F. by means of an exhaust heater. The idle stalling condition, which I mentioned here last year, has since been found to be ice formation in the idling discharge port of the carburetor. With the more volatile fuels, we have also observed the building up of ice around the throttle blade until complete closing of the throttled passage resulted."

Cold Operating Conditions

"There was no question about the potential advantages of high volatility under cold operating conditions. Doctor Brown has ably presented the many advantages of these fuels which could be fully utilized by changes in design which, I believe you can understand, the engine designer is not free to make, being limited by the lower volatility of fuels generally available. He has no choice but to design to suit the characteristics of the majority of the gasolines sold. This limitation prevents the full utilization of the potential advantages of the more volatile fuels."

In the discussion taking place following the presentation of these two papers the suggestion was made that it might be feasible to divide motor fuels into grades with respect to their volatility index. The general opinion of those attending was that three to six classifications would be sufficient with each of the grades varying accordingly for winter or summer usage.

T. R. Goebel, president of the Natural Gasoline Association, in his address at the opening of the three-day convention warned the industry that they must establish a stabilized price for their products. The practice of increasing runs during periods when supplies are scarce brings demoralizing price recessions later, he pointed out.

"These people in the natural gasoline indus-

G. B. Lane Elected President of Supply Men's Association

At the annual membership meeting of the Natural Gasoline Supply Men's Association held in Tulsa last week, G. B. Lane of the Foxboro Co. was chosen president for the coming year. Other officers elected were D. W. McKay of Cooper-Bessemer Corp., first vice president; D. E. Fields of the Tulsa Boiler & Machinery Co., second vice president, and W. D. Moorer, Moorlane Co., treasurer.

G. B. LANE

Newly elected president, Natural Gasoline Supply Men's Association

Directors elected to serve a two-year term beginning June 1 were D. E. Fields; V. C. Canter, Frick-Reid Supply Corp.; Charles D. Peterson, Fisher Governor Co.; and George W. Probst, Clark Brothers Engine Co. Other members of the directorate elected last year for a two-year term are Lane, McKay, Moorer, W. W. Woobank of Woobank Pump & Machinery Co. and W. A. Schleuter of the Refinery Supply Co.

RUGGED

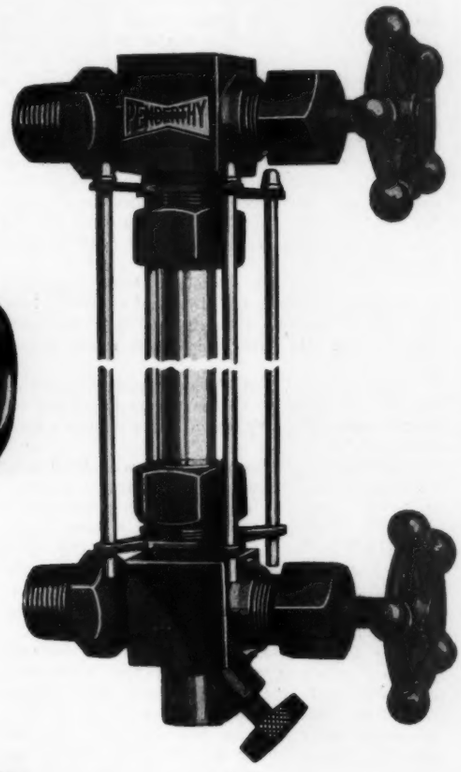
THEY CAN "TAKE IT"

DEPENDABLE operation under the most severe operating conditions is responsible for the universal popularity of these three gages throughout the oil industry. All three can and do "take it"—they are ruggedly built of the highest grade materials by an organization with 48 years experience in the manufacture of quality products. The "All Iron" is made from a modern electric iron alloy, the "Safeguard" from high grade steam metal bronze and the "Navy type" from Navy Bronze Composition M.

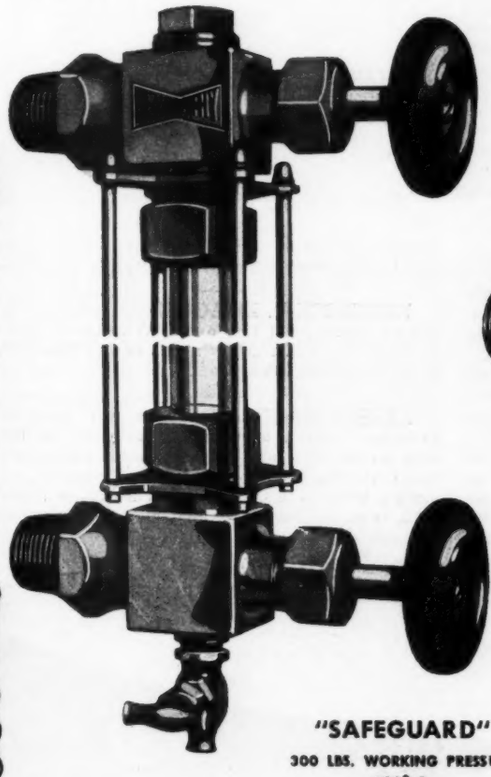
Automatic shut-off is provided on each gage. Upper and lower bodies have ball check valves that seat positively to prevent loss of liquid when glass is broken. The hand operated stop valves are then closed with safety and a new glass inserted.

Every gage is thoroughly tested and carefully inspected at the factory. Write for a copy of the new catalog that gives all the facts.

Supply houses everywhere stock Penberthy Liquid Level Gages.



"ALL IRON"
500 LBS. WORKING PRESSURE
750° F.



"SAFEGUARD"
300 LBS. WORKING PRESSURE
500° F.

"NAVY TYPE"
350 LBS. WORKING PRESSURE
500° F.

PENBERTHY PRODUCTS

PENBERTHY INJECTOR CO.
Manufacturers of Quality Products since 1886
DETROIT, MICHIGAN WINDSOR, ONTARIO

try who are awake to its economic possibilities and troubles, are becoming convinced that natural gasoline yields its highest monetary returns on an annual basis when its price throughout each year bears a reasonable relationship to middle octane motor fuel. In other words, the total production for a year brings more dollars when prices are at such levels that all refinery customers will continue the purchase and use of this material. Naturally they cannot be expected to make such purchases over any lengthy period unless they can do so at some profit to themselves. Since the refinery market is normally the highest priced market for natural gasoline it is obvious that this market volume should be maintained at a maximum level."

The fact that most oil companies have turned to more volatile motor fuels is the direct result of the association's work along these lines, he stated. A study of the motor fuels marketed during the past winter reveals that several major refiners have abandoned their former stand on volatility, he said. In the case of one major unit their position was completely reversed and their winter fuel was almost twice as volatile as it had ever been before and was nearly the most volatile on the market. The fact that some refiners are obtaining their volatility without the use of natural gasoline he regarded as a direct challenge to the gasoline manufacturers. However, this is a question of economics since "whatever can be done to a motor fuel without the use of natural gasoline can be done better and more economically with natural gasoline."

In concluding his discussion Goebel outlined the activities of the association and explained how the natural gasoline industry had been strengthened through its experiments and research program.

Following Mr. Goebel's address reports covering the work done in the past year and plans for 1936-37 were given by the various standing committees.

The Thursday morning session was devoted to the presentation of four papers: "Natural Trends," by T. W. Legatski of Phillips Petroleum Co.; "Some of the Legal Aspects of the Natural Gasoline Industry," by James E. Allison; "The Spectacular Side of Hydrocarbons," by Dr. Sidney Born of the University of Tulsa; and "Methods of Expressing the Volatility of Motor Gasolines," by W. W. Scheumann of Empire Oil & Refining Co.

"The History and Development of Natural Gasoline," was the subject of another interesting paper delivered by H. T. Ashton, Socony-Vacuum Oil Co., Inc., in the opening session of the meeting. The early history of the industry was reviewed with Mr. Ashton citing several of his interesting experiences in the Burbank and Nowata fields. He also discussed the formation of the earlier associations and the establishing of specifications for the various grades of natural gasoline. Recent developments of the industry and its future markets and outlets were given.

The Friday morning session was given over to a round-table discussion by field men of "operating kinks," many of which were illustrated by slides. This was the first session to be entirely devoted to these topics and those attending were extremely well pleased. The majority of the kinks presented dealt with improvements on tools and machinery, devised to meet certain unusual operating conditions in the field.

At the concluding session, Warren C. Platt, publisher of the National Petroleum News, spoke on "Who Has the Fun of Paying Taxes," in which he pointed out how governmental taxes usually revert back to the consumer for payment.

All officers of the association were reelected to serve another year, with T. R. Goebel, Skelly Oil Co., remaining in office as president. The other officers reelected were as follows: W. E. Reardon, Columbian Gasoline Corp.; Fred F. Ketchum, Owens, Libby-Owens Gas Dept., and R. E. Haylett, Union Oil Co. of California, all vice presidents, and William F. Lowe, secretary-treasurer.

OBITUARY

AUGUSTUS J. PENOTE, 55, president of the A. J. Penote Contracting Co. and Cleveland Trencher Co., inventor of several conduit and trenching machines, died of a heart attack May 9 in Cleveland, Ohio.

CHARLES EDWARD MILLICAN, 38, for 19 years with Humble Oil & Refining Co. as assistant manager of its land and title department in the North Texas zone, died in Wichita Falls, Tex., May 13.

JOHN O'NEIL, 63, pioneer oil man, died at Wichita Falls, Tex., May 18, of a heart attack. He entered the oil business in 1890 in Pennsylvania and had operated also in West Virginia and Ohio.

FREDERICK R. KELLOGG, 68-year-old founder of Kellogg Oil Co., and co-founder of Richfield Oil Co., died recently at his estate, Edgecliff, in Sierra Madre, California.

ALBERT HALEY, 46, on his way home to Petrolia, Ontario, after nearly 25 years in the East Indies, died at Crieff, Perthshire, Scotland, while visiting his wife and son. Learning the drilling business in Ontario, he went to Java about 1912, later drilling in Brunei and Sumatra and in 1920 becoming field superintendent of Sarawak Oil Fields, Ltd., at Miri.

WILLIAM HASTINGS, SR., 71, retired refinery superintendent, died at Houston, Tex., May 12. He was a former resident of Buffalo, N. Y., where he was superintendent for the Iroquois Natural Gas Co. for 31 years. He retired after 14 years of service as superintendent of the Vacuum Oil Co. plant at Texas City, Tex.

B. C. FORD, store manager for Frick-Reid Supply Corp. at Pampa, Tex., died May 9. He had been with the company for 12 years.

V. W. DITTMAN, 77, died in Los Angeles, Calif., April 27. He started in the Oil City, Pa., fields and was a native of Clarion, Pa., and followed the fields from Pennsylvania, Ohio, West Virginia, Kansas and Texas. He contracted for 27 years and moved to Los Angeles at the close of the Ranger, Tex., boom.

A.P.I. Eastern District

The American Petroleum Institute, Division of Production, Eastern district, will hold its meeting in the William Penn Hotel, Pittsburgh, Pa., June 4-5, the banquet being served Thursday night, June 4, in the main ballroom.

H. H. Phillips is chairman of the meeting and Fred A. Bankert secretary and treasurer. The committees are: Program, J. C. Askam, George Wittmer, 3rd, J. H. Newlon; attendance, Judge Wittmer, chairman; arrangements, Fred A. Bankert, chairman; registration, Frank Eckert, chairman.

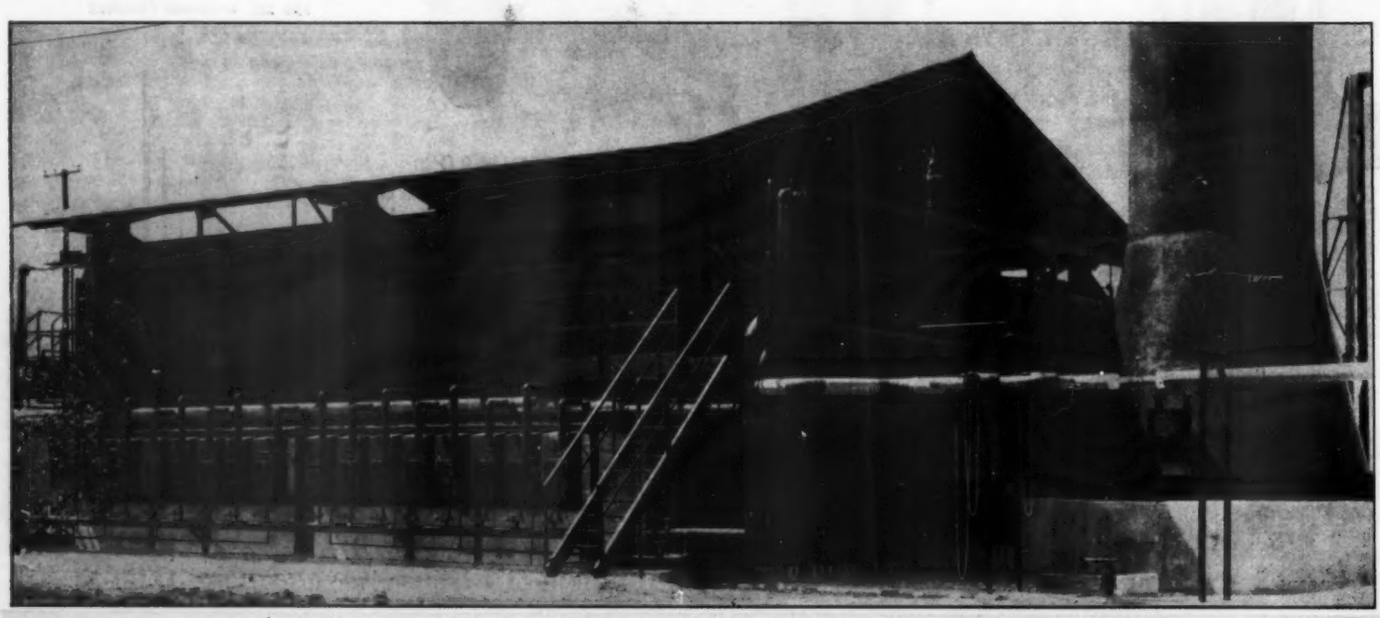
Gas Regulation Bill

WASHINGTON, D. C., May 18.—The natural gas regulation bill introduced by Representative Lea of California in the house has been reported by the Interstate and Foreign Commerce Committee, and indications are it will be favorably considered by the house, while an identical bill sponsored in the senate by Senator Wheeler may be reported by the Senate Interstate Commerce Committee without hearings.

The only major amendment is inclusion of mixed gas (natural gas mixed with artificial gas) in the regulations covering interstate transportation, as well as control of city-gate rates of such gas.

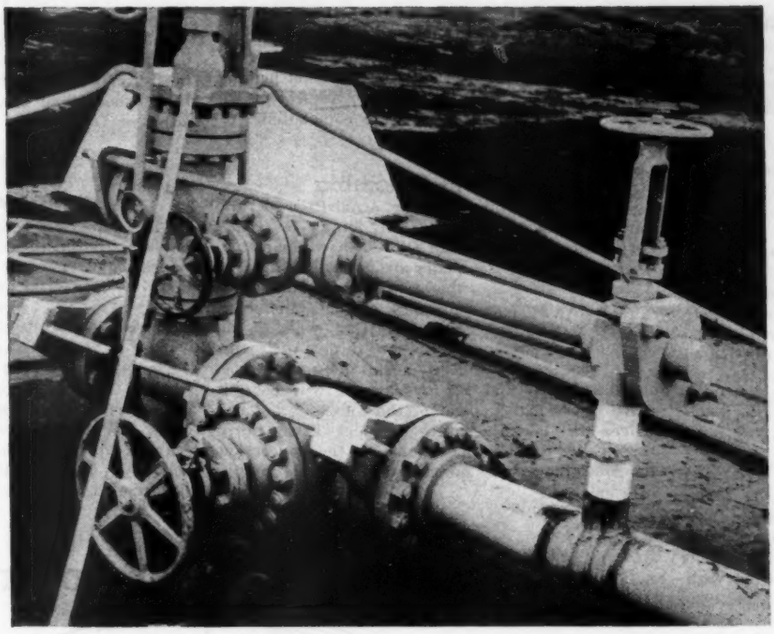
Import Tax Hearing

WASHINGTON, May 18.—Hearings on the Disney bill doubling the import tax upon crude, opened today before the House Ways and Means Committee.



Double side-fired heater as part of new 10,000-barrel per day reforming unit

KEROTEST



"BOY—WHAT A SWEET WELL"

You're right—it's a 100 per cent complete Kerotest Christmas Tree using 5000 lb. test valves and fittings throughout—matched and mated by Kerotest engineers to meet the specific requirements of this producing well . . . so solid and substantial yet so simple and easy to assemble and handle right in the field.

Two seven inch Type "W" Flanged Kerotest Drilling Valves are mounted on the casing and bolted together to provide the main control. Full casing flow is possible through the seven inch cross at the bottom while the pro-rated flow is handled through the upper cross with 4" flanged outlets and valve.

The Kerotest Forged Steel Control Choke is adjustable for any opening desired, thus providing accurate flow control for all requirements. Kerotest Armco Ingot Iron Gaskets were used throughout.

Why not avail yourself of Kerotest service? The broad experiences of Kerotest engineers in the design and assembly of complete Christmas Trees is yours for the asking. Just say the word and we shall be happy to assist you.

KEROTEST MANUFACTURING CO.
PITTSBURGH, PENNSYLVANIA

KEROTEST

Oil News from Foreign Lands

Lack Reserves in Poland

The oil industry of Poland is reported to be declining due to the failure to find new oil reserves. The trend is indicated by the 1935 figures showing output of crude by fields (in barrels) as follows:

	1935	1934
Droholycz	1,801,860	2,109,660
Jasio	696,560	687,660
Stanislawaow	247,870	244,370
Total	2,746,290	3,041,690

POLAND

As the figures indicate, the decline in output is entirely in the Droholycz field, which is the principal one in Poland, while increases in the other fields have been merely nominal. New natural gas deposits have been discovered in the Daszawa area. The two fields in Poland produced approximately 1,500,000,000 feet in 1935. They are the Daszawa and Roztoki fields. The Polish refineries in 1935 and 1934 ran considerably more crude than was produced domestically. The runs in 1935 amounted to 3,565,688 bbls., compared with 3,693,592 bbls. in 1934.

Domestic consumption of petroleum products in 1935 amounted to only 2,192,568 bbls. While this is a relatively small increase compared with 1934, it is still some 33 per cent below the 1930 demand, which amounted to 2,864,449 bbls. Poland is one of the few countries which continues to use kerosene for illuminating purposes on an important scale. Kerosene accounts for approximately 30 per cent of the total consumption of petroleum products.

Sweden's Oil Imports

Imports of petroleum and its products into Sweden during 1935 amounted to 6,174,000 bbls., exclusive of wax, asphalt and pitch, compared with 6,301,000 bbls. in 1934. Imports of paraffin wax aggerated 11,381,000 pounds, against 7,750,000, an increase of approximately 47 per cent. Asphalt imported increased from 5,529 metric tons in 1934 to 6,933 tons in 1935, a gain of 25 per cent. Imports of the principal products in 1935 and 1934 were as follows (figures in barrels):

SWEDEN

	1935	1934
Crude oil	619,000	438,000
Gasoline	3,330,000	3,018,000
Kerosene	841,000	745,000
Gas and fuel oil	2,029,000	1,761,000
Wax (pounds)	11,381,000	7,750,000
Asphalt (M. tons)	6,933	5,529
Petroleum pitch (M. tons)	24,251,000	15,667,000

The foregoing figures were compiled from consular reports by the U. S. Bureau of Mines.

Largest Shipment of Benzol

The motor tanker "British Faith" recently left Newcastle, England, with what is considered to be the largest shipment of pure benzol ever to leave any port in the world. The cargo, consisting of 7,000 tons, was consigned to the Commonwealth Oil Refineries, Ltd., at Melbourne, Australia, for blending with Australian gasoline. The benzol was distilled at the Newcastle plant of the Broekn Hill Co., Ltd.

AUSTRALIA

The railway system of Queensland, Australia, is being improved by the addition of diesel engine rail motor trains. The latest to be added is a 100 horsepower compression-ignition engine, capable of developing 102 horsepower at 1,700 r.p.m., according to the Brisbane "Courier-Mail." The total weight of the train is 23 tons and the car has a capacity for 24 passengers, the leading trailer 38 and the rear trailer 20, a total of 82. The second train is now nearing completion.

Drilling in Colombia

With the negotiations for acquisition of the Barco oil concession from Gulf, jointly by Texas Corp. and Socony-Vacuum Oil Co. now completed, plans are going forward for the removal of the headquarters of the Colombian Petroleum Co., owner of the concession, to new offices in New York. Representatives of both Texas and Socony-Vacuum will have a share in the management of the company, but the offices will be adjacent to those of Texas Corp. Meanwhile, drilling operations on the concession are continuing, with no new developments so far reported.

COLOMBIA

Trinidad Seeks Preference

Trinidad has appointed a committee to promote preferential treatment for Trinidad oil in the United Kingdom market, as a climax of efforts which have been under way practically since 1919. It is the general belief in Trinidad that the country could produce much more petroleum than is now being recovered and that, as a Crown Colony, its petroleum products imported into the United Kingdom should pay a smaller duty than such products from the United States, Venezuela and other foreign countries. Trinidad is at present exporting oil at the rate of approximately 2,000,000 bbls. per annum, and must compete with the heavy shipments, amounting to more than 100,000,000 bbls. annually, from adjacent Dutch West Indies islands.

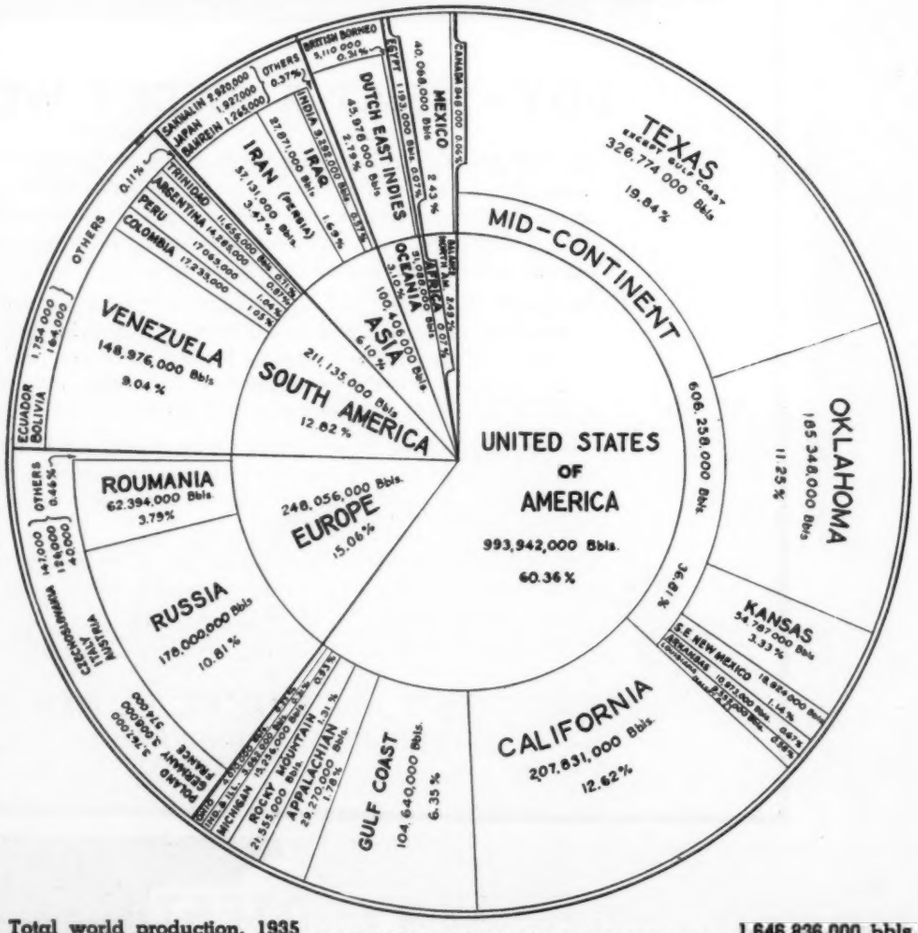
TRINIDAD

Japanese Oil Control

The situation relative to the new petroleum law and the operation of importing oil companies which supply most of the petroleum requirements of Japan is unchanged. The regulations under the new law requiring the construction of extensive storage facilities in Japan and the maintenance of large stocks of oil do not go into effect until July 1. Meanwhile efforts are being made by the companies to induce the government to relax these particular requirements, which, if unsuccessful, may result in a serious situation, it is generally admitted in oil circles.

JAPAN

WORLD CRUDE OIL PRODUCTION



Total world production, 1935 ..... **1,646,836,000 bbls.**
Increase over 1934 ..... **126,921,000 bbls.**
U. S. share 1935 ..... **60.36 per cent**
U. S. share 1934 ..... **59.74 per cent**

(The Lamp)

"Summer gasoline demand of record-breaking proportions is counted on to cause the present large stocks of gasoline to melt away rapidly"
—KEITH FANSHIER, CHICAGO JOURNAL OF COMMERCE

Let's hope so

But even record-breaking consumption won't cause large stocks of straight-run gasoline to "melt away" very fast unless you sell at a price so low that all chances for profit melt away with it

Dubbscracking is the way to make gasoline

Dubbscracked gasoline goes to market —not to storage—and you can get the price for it

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

the OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

Published weekly by THE PETROLEUM PUBLISHING COMPANY at Tulsa, Oklahoma

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Destructive Discrimination

The American petroleum industry has made its own way without ever having asked favors from the government or discriminatory legislation against competitors. On the contrary it has been a special mark for legislative exploitation for the benefit of others.

If public revenues fell below political expenditures the first thought has been to pile more taxation on the oil industry or its customers. When the railroads failed to realize the possibilites of motor traffic they sought governmental handicaps on highway competition. When the coal industry, dependent on a natural resource raw material like the oil industry, got itself into a muddle it began shouting for governmental aid to throttle oil competition. When the "denatured alcohol" panacea fell flat the new found "friends of the farmer" visioned another mirage in blending alcohol with gasoline buttressed by a governmental subsidy or legislation favoring or compelling its use.

Meanwhile the oil industry has gone independently forward, finding, producing and refining the power and lubrication without which the great automotive industry with its 26,000,000 vehicles could not have been realized, the two industries alone contributing more than a billion dollars yearly in tax revenue, creating employment for millions and spreading the resulting business nation-wide.

Directly the oil industry has developed a billion dollar a year market for the manufacturers and suppliers of its own equipment as exemplified in the great International Petroleum Exposition now on display in Tulsa. Moreover American oil equipment, and American methods, are so efficient as to be universally recognized as the world's standard.

An industry with such a record has the right to protest as the directors of the American Petroleum Institute protested in Tulsa last week that discriminatory taxes or legislation upon any industry or its customers for the selfish benefit of another industry is opposed to public welfare.

Governmental discrimination that would destroy or impair the earning power and taxpaying power of the oil industry would be a suicidal policy.

The American petroleum industry is an outstanding example of industrial achievement independent of uneconomic or discriminatory policies of taxation or legislation. It shows that free competition, unhampered by political aid or restriction, alone assures the public the greatest possible service at the least possible cost.

To limit that progress by discriminatory taxation or legislation for the benefit of laggard industries would be to deny the public its rightful due and is indefensible on any theory of general welfare.

Opening of ninth International Petroleum Exposition, Tulsa, May 16, 1936

Oil Industry to Spend Billion Dollars for 1936 Equipment and Supplies

A billion barrel oil industry in 1936 will spend a billion dollars for equipment and supplies.

The thousands of operators engaged in all branches of the oil business this year in finding, producing, transporting, refining and distributing a barrel of petroleum and providing for future needs, will spend at least one dollar with other industries. This explains why the several hundred manufacturers whose products either directly or through supply companies are on display at the Ninth International Petroleum Exposition in Tulsa this week enjoy a market not obtainable from any other industry.

In equipment the requirements of the industry range from the smallest scientific instruments of the laboratories to the many ton drilling rigs of the fields and the major processing units of refineries. Supplies include some of the most costly chemicals as well as complete lines of construction materials.

Several factors are tending to expand purchases this year. In the producing end operators must not only bring to the surface more crude than in any previous year to supply current demands, but they must discover new reserves for future years. Refiners are making up for time lost during the depression period in modernization and new construction programs never exceeded in the history of the petroleum industry. Pipe line construction so far announced includes several major projects with a large number of small extensions. Routine expenditures in the maintenance of existing lines will exceed previous years.

New equipment in construction work this year in all branches of the industry has been outstanding. This reflects not only the dearth of used materials but also the remarkable efficiency of new equipment with assured savings to its users.

The survey made by The Oil and Gas Journal which was the basis for the data given on this page and section showed that a substantial part of new drilling would be in proven fields where deep drilling is necessary and where expenditures for equipment and supplies are relatively high.

No attempt was made to determine the expenditures to be made outside the United States. Foreign operations have expanded to the point where they account for a little less than 40 per cent of the world's crude oil production and crude runs to stills. These operations for the most part follow practices first established in United States and American manufacturers have a substantial export business. These expenditures were not estimated but it is certain that if they were added to the domestic figures shown in table they would give a total in excess of one billion dollars for 1936.

1936 Purchases of Equipment and Supplies

Divisions	Estimated Purchases
Producing	$457,962,400
Refining	231,230,000
Marketing	150,000,000
Pipe line	50,000,000
Transportation (marine and tankcar)	43,000,000
Natural gasoline	25,000,000
*Total	$957,192,400

*Does not include foreign purchases. Details of purchases explained in following pages.

Northeast quadrant of the new drilling zone in the Oklahoma City

Greatest Total in Footage of Drilling in Oil History Indicated for 1936

All signs indicate 1936 is to be a banner year for exploration and development of new oil fields. The demand for crude has been steadily at about a billion barrel rate thus far this year and the need for flush production to make available an ample supply of easily obtainable oil is evident. The estimated reserves of more than 12,000,000,000 bbls. of oil in this country assure the industry of a future supply but still does not solve the pressing problem of having more than 2,750,000 bbls. of oil available for production each day at costs in keeping with present prices of finished products.

After several years of minimum activity in the search for new oil pools the industry again became active in this department about three years ago when leasing was resumed upon a larger scale and land secured around key blocks held over from the former boom period when all oil companies held millions of acres under lease. Retrenchment had caused the relinquishment of a large portion of these leases and only the most attractive were retained to form the nucleus around which to rebuild large blocks of prospective oil land under lease.

In addition to the necessity for testing the land held under the older leases millions of acres have been gone over by some geophysical method to determine the probability of favorable structure for oil and gas accumulation beneath the surface. Modern geology looks upon geophysical methods more as a tool to aid in the determination of other factors than as a means of locating oil or gas reservoirs. By the use of geophysics vast areas are being checked each year at a relatively low cost per acre and by such checks the land departments are able to make quick decisions as to whether it is advisable to hold or reject leases. When favorable structure is indicated the usual procedure is to again work the area more closely and if this check confirms the original reports the next step is to explore with the drill to determine whether oil and gas in commercial quantities have accumulated in the reservoir rocks.

It has been estimated more than $16,000,000 was spent during 1935 in geophysical work. Approximately 200 crews per month were engaged in all phases of this work during last year and it is safe to estimate 1936 exploration work will continue at the same rate or better. This first stage of development work has been going on for some time and well organized companies have been giving careful consideration to the reports at hand and planning the start of new wells and the time is rapidly approaching when many of these wildcats will be authorized.

An estimate of the land under lease indicates nearly 100,000,000 acres covered by oil and gas leases in the oil-producing states or about 10 times as many acres as regarded as proven oil and gas territory. This figure is constantly changing because under modern methods the parcel of land under consideration may be checked out as prospective oil territory shortly after being acquired by the use of geophysical methods. It is reported land is being leased on the old "checkerboard" system in many states and just as quickly as possible after lease is secured geophysical parties will check the property and make report.

The accompanying table gives estimates of probable activities during 1936 in the several oil-producing provinces. They are based upon an increase of 18.5 per cent over 1935, with a total of about 25,000 wells for the year. The table indicates the states in which these wells will be located but there are several regions now receiving special attention and an analysis of the table will discuss them and point out why this activity is expected to continue during the balance of this year.

In considering the volume of new business to accrue from this activity it is well to remember that practically all old equipment has been used or disposed of in some manner and is therefore no longer available to transfer from one well or from one field to another beyond the normal salvage of equipment which goes on regularly in all oil fields.

This condition is further reflected in reports from supply men and manufacturers' representatives indicating decided increases in the volume of business entered for the first three months of this year with inquiries still accumulating, indicating little slackening of pace.

Drilling contractors no longer have yards filled with equipment awaiting contracts but most active contracting firms have been buyers of much additional equipment during the past few months. One contractor in northern Louisiana recently purchased at one time four complete new drilling outfits. Every piece of equipment on each of these four rigs was just out of the manufacturers' stock and the sale represented an investment in excess of $300,000. Other contractors in the Oklahoma-Kansas area are reported as having bought more than $500,000 worth of new equipment this year and one or two of these large firms are now running from 50 to 100 rigs.

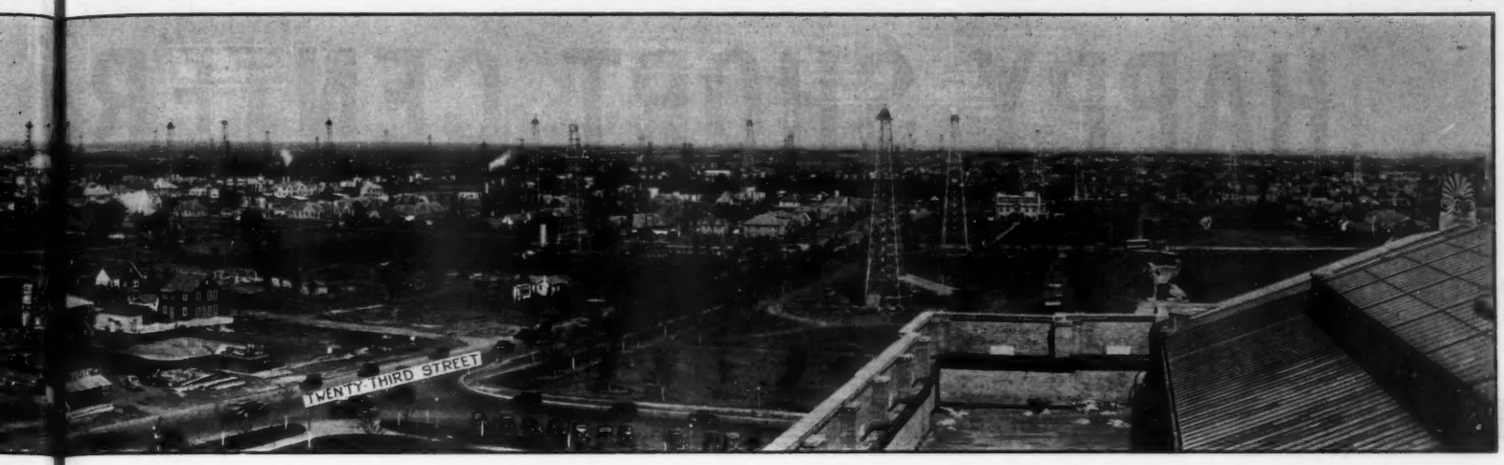
During the recent renewed activity in the Oklahoma City field contractors in other areas were approached with offers of increased contract price per foot of hole and payment of moving costs from the fields where their material was located to Oklahoma City and return. Experienced drillers and helpers are in demand in all fields and in many instances helpers have been promoted to driller's status where it is known they have had sufficient experience.

In the East there is a constant volume of work carried on in the older fields, much of it in connection with secondary recovery operations. While the investment per well is not high compared with wildcatting in some of the Mid-Continent and California areas the total spent and the work done amounts to an appreciable sum during the year.

Michigan has an active demand for oil for the refineries within the state and during the first 100 days of this year about 200 drilling permits were issued compared with 102 for the same time during 1935. There are many wildcats being drilled in Michigan and if any new pools are opened the area will be quickly drilled up. Last year the Crystal pool was discovered and within a year it was drilled up and had passed peak production rate and was definitely on the decline. This indicates the need for new discoveries in this state and encourages wildcatters and established companies alike to prospect for new productive areas.

There are many inducements offered to oil operators by Kansas state regulatory bodies and increased pipe line facilities added last year and contemplated this year indicate clearly this state will enjoy a very active drilling campaign. The western part of the state has been the scene of numerous strikes during 1935 and more than 50 new pools have been opened and these areas immediately offer inducements for drilling up of the proven region because the flush oil can be produced at low costs and with good pipe line demand it seems probable a very considerable sum will be spent in Kansas this year. Many short term leases in highly prospective areas will play an important part in starting many of these drilling campaigns.

At the moment there are two or three "hit spots" in Oklahoma but because of the front page publicity it has received the Oklahoma City pool



ahoma City field, photographed from roof of Oklahoma State Capitol

—Acme Service, Oklahoma City.

play is probably the most important. Nearly 200 active locations have been made in the north extension and it appears more than 300 wells will be drilled in what is now considered as the proven area and if some key wells drilling outside of the new zones strike oil the activity will undoubtedly be extended. These wells require approximately $42,500 worth of new equipment for their completion and it is easy to estimate the large sums to be spent in the search for oil in this field.

This willingness to spend money on the chance good wells will be developed indicates one of the present trends of the industry. The amount required to drill wells is a secondary consideration if the possibilities of securing oil is good. This holds true in several other very active areas and will be repeated just as many times as wildcats open new pools.

West Texas and Southwest Texas are now very active localities and because of the large areas of proven territory known to exist there it is very likely drilling activities will see little decline during 1936. The present trend is upward and this oil is in demand and will continue so until some other large sweet oil field is opened more favorably located with regard to consumers' plants.

Louisiana is also likely to have a very active drilling campaign this year, especially in the northern part where the discovery of production in the Trinity formation in Rodessa field has caused operators there to view this deeper formation favorably after long considering the limits of production within the Cretaceous rocks. The new concept of oil possibilities in deeper formations will lead to many wildcats being drilled in older fields as well as in unexplored territory and if strikes are made quick drilling up of the productive acreage will follow.

There appear to be many tests scheduled for eastern Colorado where about 20 blocks have been assembled from 20,000 to 900,000 acres in size, upon all of which it is probable at least one test well will be started this year. These tests will be costly and require the best and heaviest equipment and as most of the drilling outfits suitable for such work are already engaged it seems probable much new equipment will be purchased.

Other Rocky Mountain states will receive attention and if New Mexico is so classified it seems probable the southeastern portion of that state is to witness a very active campaign this year. At present there are about 30 to 35 completions reported weekly and there are sufficient undrilled locations in proven territory to assure the maintenance of this rate of drilling for the balance of the year. New pipe lines completed into this area recently assure ample outlet and there is evidence of a greater demand developing for it this year.

In the extreme western part of this country there is an active demand for crude with about 10,000,000 bbls. estimated added to California reserves during 1935. Many structures mapped by geophysical surveys proved dry simply because oil or gas in commercial quantities had never accumulated in these formations. There is an active campaign covering the exploration of prospective oil-bearing areas but more particularly the operators in the older fields are busy attempting to increase the yield from their properties by reworking upper formations passed up during drilling. These upper pay streaks will yield more oil now than the lower and formerly richer sands but there are many mechanical problems to be considered and solving them will involve the spending of considerable money for equipment.

There will be money spent in several other areas not yet productive of oil or gas in commercial quantities. Some of this work is now under way and additional tests will be started this year. This type of exploration will for the most part be costly because the formations to be penetrated are of unknown quality and such work will necessitate large expenditures for equipment.

In addition to money needed for exploratory work there will be a considerable sum spent this year for the upkeep of producing wells in the older fields and the equipping for the first time of wells in the younger fields that now must go upon some form of mechanical production method. The actual methods to be applied to such wells will vary through wide ranges of production practice but it is known operators will feel justified in spending a sum in keeping with the probable future returns of the wells and in this way it is possible to arrive at emphirical figures giving some idea of expenditures for new equipment. The supplies needed per barrel of oil produced can also be estimated fairly closely from the total producing costs of the various fields and from the present selling price of the crude oil.

Expenditures 1936 by Production Division for Maintenance of Old Wells and Drilling New Wells

Area—	Completions 1935	Per cent	Estimated completions 1936	Estimated investment new equipment	Proportion of 1936 production (bbls.)	Producing wells at end 1935	Daily av. prod./well (bbls.)	Estimated expenditures for equipment
Eastern	3,792	17.75	4,000	$14,000,000	37,370,000	172,057	.615	$11,250,000
Michigan	593	2.76	700	4,550,000	14,000,000	1,172	36.910	3,836,000
Kansas	1,210	5.65	1,750	32,812,500	52,225,000	19,950	7.330	11,100,000
Oklahoma	2,010	9.35	2,500	60,000,000	88,000,000	54,825	9.120	17,652,500
Texas:								
North Central	2,585	12.10	2,500	20,000,000				
East Central	251	1.16	300	2,000,000				
East Texas Gas	12	.....	15	35,000				
East Texas	4,166	19.40	4,850	38,665,000	405,000,000	60,125	17.840	38,801,500
West Texas	830	3.86	970	16,000,000				
Panhandle	705	3.30	700	8,750,000				
Southwest Texas	1,611	7.50	1,880	15,000,000				
Texas Gulf	1,074	5.00	1,250	31,250,000				
Louisiana Gulf	354	1.65	415	12,450,000	57,775,000	3,311	41.610	5,148,900
North Louisiana	343	1.60	500	15,000,000				
Arkansas	115	.54	134	2,110,000	11,600,000	2,682	11.380	400,0000
Montana	186	.87	218	4,360,000	440,000	1,289	9.280	566,000
Wyoming	92	.43	108	2,500,000	12,500,000	3,647	9.940	575,000
Colorado	18	.....	30	1,350,000	1,470,000	199	21.410	200,000
New Mexico	337	1.58	1,150	25,000,000	22,700,000	771	71.590	6,200,000
California	1,110	5.20	1,300	47,500,000	198,000,000	12,778	44.540	5,800,000
Mississippi	16	.....	20	2,500,000				
Alabama	4	.....	5	500,000				
Utah	5	.....	5	100,000				
Total	21,420		25,300	$356,432,500	1,001,780,000	332,806		$101,529,900

HAPPY SHORT CENTER ENDLESS FLAT BELT DRIVE

THE STRAIGHT LINE TO ULTIMATE

HAPPY MULTI-FLEX CORD

OFFERING improvements comparable to the modern cord tire over the old fabric structure, the cord construction of the HAPPY MULTI-FLEX Belt gives added *flexibility* with higher fatigue resistance, eliminates ply separation or "bootleg" and made by the NEW Continuous Vulcanization Process every inch is vulcanized perfectly, insuring absolute stretch and pressure control, without danger of undercure or overcure and elimination of press marks and overlaps.

These improvements in belt construction make possible new efficiency in HAPPY Short Center Endless Flat Belt Drives effecting economies both in first cost and ultimate operating economy with higher efficiency.

MADE BY THE NEW
CONTINUOUS VULCANIZATION PROCESS

HAPPY MULTI-FLEX CORD
HAPPY STRAIGHT EDGE
HAPPY PLI-CORD
HAPPY INNERSTITCHED

—All four made by the continuous vulcanization process—uniform thickness, every inch vulcanized perfectly.

SIXTEEN YEARS OF LEADERSHIP

HAPPY BELTING CO. HBC TULSA OKLA

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310 EAST TENTH STREET

All Happy Belts are manufactured by the Boston Woven Hose and Rubber Company,

flexibility OF POWER TRANSMISSION

OPERATING ECONOMY AND EFFICIENCY

In the HAPPY Short Center Endless Flat Belt Drive the shock load is transmitted to the belt which has the *flexibility* to absorb sudden shock—with the belt tightner equipped with rubber bumpers acting as shock absorbers compressing at peak polish rod loads and engine impulses, shock loads are NOT transmitted to expensive equipment—cause of frequent break-downs with costly repair and loss of production.

This type drive allows shorter belt halls with less concrete, provides room for sand reel, permits servicing of well, drilling in or to drill deeper—first installation provides adequate H.P. to handle ultimate maximum demands. The equipment to handle heavy wells at low upkeep.

RUBBER BUMPERS

FLEXIBILITY

Absorbs Shocks
Saves Equipment

Low Installation

H.P. To *Handle*
Heavy Wells

BELTING COMPANY

TULSA, OKLAHOMA

patentees, owners and operators of the exclusive continuous vulcanization process

Night view taken in Union Oil Company's refinery at Olean, Calif., showing new propane deasphaltizing unit

Oil Refiners to Spend Quarter Billion Dollars in 1936 Expansion Program

In the United States during 1936 oil refiners will spend approximately $231,230,000 for new equipment and for supplies needed to keep their plants operating. An important item is that of "heavy equipment" for which will be spent at least $67,000,000, the principal expenditure to be that for cracking equipment.

These data reflect but a small part of the total money spent annually by this branch of the oil business, the amount of which will reach well beyond $2,000,000,000 in 1936. This total of course provides for paying oil producers for the oil and pays the pipe line operators, railroads and tank line companies for transporting the crude to the 500 refineries scattered over 30 states in this country, and also pays for the $81,000,000 worth of natural gasoline refiners will purchase from manufacturers to augment the crude supply. It should be pointed out that oil producers will receive slightly in excess of $1,000,000,000 for the oil in the field providing crude prices remain at their present level and should an advance be posted later in the year, the amount of money paid these producers will be proportionately greater. Thus oil refining justifies recognition as one of the principal industries directly affecting the general economic welfare of the country.

Prefabricated Units

Reference has been made to the item of $67,000,000 as representing the amount of money refiners will spend in 1936 for heavy equipment. In this classification are considered such major installations as combination skimming and cracking units, solvent refining and solvent dewaxing plants, reforming equipment, cracking units, vapor recovery units, stabilizer units, etc. It has become the practice among refiners to install such equipment as prefabricated units purchased from equipment companies instead of designing and assembling them under the direction of the refining company personnel. It is for this reason that the figure of $67,000,000 is marked "heavy equipment" although in actual practice a portion of that money is paid out by the equipment companies receiving the contracts for the labor used in assembling the parts as they are received on the plant site.

A brief review of the accompanying table showing the construction work completed in the past four months and now under way gives some idea of the trend in refinery construction. It is reasonable to assume that at least half of the total money being spent for heavy construction is going into cracking equipment, either as combination skimming and cracking projects or as separate cracking units. Reforming, a form of cracking, is an important item while polymerization is an equally important item. As time goes on, polymerization will no doubt become a very much greater item in the total and while polymerization may be incorporated into the combined skimming, cracking and stabilization unit of the future and in that way its importance as a distinct process covered up, its growing usefulness will not be lost to those who know its application.

Another classification of refinery equipment calling for large expenditures of money is the group of processes utilizing solvents to carry out certain separations as in the case of solvent refining and the solvent dewaxing of lubricants. This has become an accepted method for manufacturing high quality oils and although the capacity of existing solvent refining plants is sufficient to handle close to 50 per cent of the total motor oil and special industrial oil needs, important installa-

tions are being planned and the field for the application of solvent dewaxing is far from the point of saturation.

Included in the figure mentioned previously as the estimated total expenditure refiners will make during 1936 for equipment and supplies is that of chemicals. Very few individuals appreciate the degree to which common chemicals enter into the manufacture of motor oils, and lubricants.

During this year refiners will purchase about $91,000,000 for chemicals. The largest single item in this total will be that of motor fuel additives, inhibitors and dyes. In fact, about one-half of the total is taken up with these three.

Sulfuric acid is the second most important expenditure in the list, the delivered cost of which will approximate $22,000,000. To make up the balance expenditures of between $1,000,000 and $10,000,000 will be made for each caustic soda, refrigerants, fullers earth and additives for greases and expenditures ranging from $100,000 to $1,000,000 each will be made for solvents, litharge, water softeners and soda ash.

Refinery Expenditures for 1936

Heavy prefabricated equipment such as cracking units, combination distillation units, polymerization plants, solvent units, etc.	$ 67,000,000
Chemicals including motor fuel additives, inhibitors, dyes, refrigerants, sulfuric acids, caustic soda, chlorine, solvents, litharge, water softening chemicals, etc.	90,990,000
Maintenance equipment to keep plant in normal operating condition	28,440,000
Utilities including electricity, water, ice, telephone, etc	11,000,000
Containers such as cans, drums, barrels, cartons, etc.	18,800,000
Miscellaneous items	15,000,000
Total estimated expenditures for equipment and normal operating supplies	$231,230,000

Maintenance Equipment

Thus far on the summary of expenditures no consideration has been given to the cost of equipment going into the normal operation and maintenance of the plant. Obviously, this cost represents a large item and in practice it approximates an average of .015 cent per barrel of crude processed. The actual cost will vary over a wide range depending upon the natural of the refinery operations but considering the effect of cracking, lubricating oil manufacture, compounding and all other operations, the above figure is thought to be representative. On this basis it becomes apparent that refiners will spend in excess of $28,000,000 for equipment to simply keep their plants in repair and up to normal operating condition, without accounting for any expansion of capacity or major replacements.

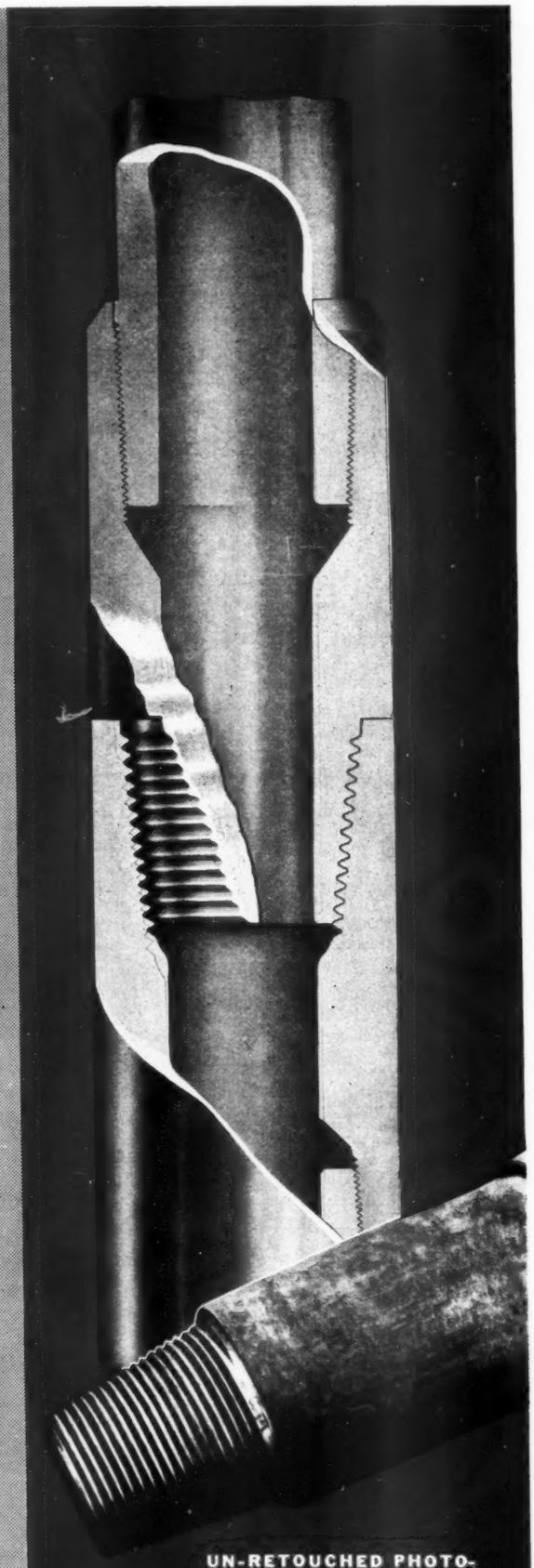
In the operation of the plants and in the list of purchases made the item of purchased electric power must be considered. This will approximate $7,500,000 annually and in addition to electricity, large quantities of water are purchased annually. Telephone services are used on a liberal scale and the utilities bill will reach $11,000,000 annually.

Major Refinery Construction Under Way or Recently Completed in the United States

Company—	Location of refinery—	Nature of work—
Atlantic Refining Co.	Atreco, Tex.	Complete refinery including 20,000-bbl. combination topping, cracking and reforming unit. Also 1,200-bbl. thermal type polymerization unit.
Atlantic Refining Co.	Point Breeze, Pa.	Three vapor phase clay treating towers.
Barnsdall Oil Co.	Barnsdall, Okla.	Modernization of entire plant including replacement of existing distillation equipment with 6,000-bbl. combination topping and cracking unit.
Continental Oil Co.	Ponca City, Okla.	Solvent dewaxing unit to finish 400 bbls. per day. Also solvent recovery plant.
Crown Central Petroleum Co.	Houston, Tex.	Modernization of plant including installation of 16,000-bbl. atmospheric and vacuum crude distillation unit.
Derby Oil Co.	Wichita, Kans.	6,000-bbl. topping unit.
Eastern States Petroleum Co.	Houston, Tex.	10,000-bbl. two-coil combination cracking and reforming unit.
East Texas Refining Co.	Longview, Tex.	10,000-bbl. skimming unit.
El Tejon Refining Co., Inc.	Bakersfield, Cal.	3,500-bbl. skimming plant.
Gulf Refining Co.	Port Arthur, Tex.	4,000-bbl. naphtha rerun unit. Methyl ethyl ketone dewaxing unit. Multi-sol refining unit. Gulf type cracking units converted to combination units and 8,000-bbl. absorption-stabilization unit.
Griswold Refineries	Sandra, La.	5,000-bbl. skimming plant.
Humble Oil & Refining Co.	Baytown, Tex.	Expanding solvent plant. 2,000-bbl. thermal polymerization unit and pressure tankage.
Inland Refining Co.	Drayton Plains, Mich.	2,200-bbl. skimming plant.
Inter Lakes Refining Co.	Flat Rock, Mich.	1,000-bbl. cracking unit.
Independent Refining Co.	Billings, Mont.	Revamping plant and installing 1,000-bbl. cracking unit.
Kendall Refining Co.	Bradford, Pa.	Solvent dewaxing plant; boiler house and electrical generating plant.
Leonard Refineries, Inc.	Alma, Mich.	1,500-bbl. cracking unit.
Louisville Refining Co.	Louisville, Ky.	2,400-bbl. cracking unit.
Magnolia Petroleum Co.	Beaumont, Tex.	32,000-bbl. combination topping cracking and reforming unit, and revamp from 2,000-bbl. cracking unit.
Magnolia Petroleum Co.	Fort Worth, Tex.	Revamp 2,000-bbl. cracking unit.
Mid-way Refining Co.	Pettus, Tex.	1,000-bbl. cracking furnace and necessary equipment.
Mid-Continent Petroleum Corp.	Tulsa, Okla.	12,000-bbl. atmospheric and vacuum crude distillation unit. 10,000-bbl. rerun unit.
Moutray Refining Co.	Hawley, Tex.	Cracking furnace.
Naph-Sol Refining Co.	Muskegon, Mich.	Expansion of distillation equipment.
Phillips Petroleum Co.	Borger, Tex.	Polymerization unit.
Premier Refining Co.	Longview, Tex.	1,000,000-foot vapor recovery plant and 800-bbl. pressure distillate stabilizer unit.
Old Dutch Refining Co.	Muskegon, Mich.	Add to crude distillation equipment and installing 1,500-bbl. cracking unit.
Panama Refining Co.	Rodessa, La.	1,000-bbl. skimming unit.
Pan American Refining Corp.	Texas City, Tex.	36,000-bbl. combination crude topping, cracking and reforming unit. 5,000-bbl. catalytic-polymerization unit; additions to power plant, water system and tankage.
Pentagon Refining Co.	Detroit, Mich.	2,000-bbl. skimming plant.
Phoenix Refining Co.	Bay City, Tex.	1,000-bbl. skimming plant.
Producers Refining Co., Inc.	West Branch, Mich.	1,500-bbl. skimming plant.
Pure Oil Co.	Cabin Creek, W. Va.	1,500-bbl. cracking unit. 2,000-bbl. crude distillation unit.
Pure Oil Co.	Smiths Bluff, Tex.	20,000-bbl. combinaiton topping and cracking unit.
Pure Oil Co.	Toledo, Ohio	8,000-bbl. combination topping and cracking unit.
Quaker State Oil Refining Co.	Farmers Valley, Pa.	New dewaxing plant; boiler house and electric generating equipment.
Republic Oil & Refining Co.	Texas City, Tex.	6,000-bbl. cracking furnace.
Southport Petroleum Co.	Texas City, Tex.	5,000-bbl. cracking unit.
Shell Petroleum Corp.	Houston, Tex.	20,000-bbl. combination unit and vacuum distillation unit. 10,000-bbl. reforming unit.
Shell Petroleum Corp.	Wood River, Ill.	30,000-bbl. combination topping, cracking and reforming unit; 2,000-bbl. solvent dewaxing unit. 2,000-bbl. solvent refining unit; iso-octane plant.
Shell Petroleum Corp.	Arkansas City, Kans.	Modernized cracking equipment.
Shell Oil Co.	Dominguez, Calif.	General modernization program including erection of iso-octane plant.
Shoreline Oil Co.	Lewis, La.	Cracking and reforming unit.
Sinclair Refining Co.	Sand Springs, Okla.	Modernization of plant.
Sinclair Refining Co.	East Chicago, Ind.	Polymerization unit.
Skelly Oil Co.	Eldorado, Kans.	15,000-bbl. light oil furnace.
Socony-Vacuum Oil Co., Inc.	Paulsboro, N. J.	3,000-bbl. dewaxing unit.
Socony-Vacuum Oil Co., Inc.	Olean, N. Y.	Solvent dewaxing unit and power equipment.
St. Helens Petroleum Co.	Los Angeles, Calif.	New ethyl blending.
Standard Oil Co. of California	Richmond, Cal.	20,000-bbl. atmospheric and vacuum distillation unit. 3,400-bbl. lube rerun unit.
Texas Co.	Port Arthur, Tex.	Solvent dewaxing unit. Solvent reforming unit.
Texas Co.	Marcus Hook, N. J.	2,800-bbl. asphalt still.
United Refining Co.	Warren, Pa.	1,000-bbl. cracking unit.
Wilshire Oil Co., Inc.	Santa Fe Springs, Cal.	12,000-bbl. refinery with 8,000-bbl. cracking unit.
Wood Moore Corp.	Port Lavaca, Tex.	2,000-bbl. skimming plant.

REED
TOOL JOINTS
DEPENDABLE AT RECORD DEPTHS

Mid-Continent and Gulf Coast Distributors for MARTIN-DECKER PRODUCTS



UN-RETOUCHED PHOTOGRAPH OF ONE OF THE 3½" REED FULL HOLE TOOL JOINTS IN THE STRING USED ON THE MC ELROY NO. 103

WHEREVER THERE IS ROTARY DRILLING

WONDER DOWN 4000 FEET IN SIX WEEKS

RICHFIELD, July 14.—The Wonder Company, Ltd., set pipe at Kraemer Home Place No. 2 at 3197 feet. In six weeks the 4000 feet of hole was made, and the record is worthy of mention for the Richfield district. The hard places were drilled with a Reed Roller bit, now recognized as the fastest rock-cutting tool.

...GELES EVENING EXPRESS

...NEWS...

WONDER SETTING DRILLING RECORD

RICHFIELD, June 30.—Drilling on the Wonder Company's No. 2 is making splendid time. In the few weeks that this well has been under way it has made 2100 feet. Wonder No. 1 is still a consistent 1200-barrel well.

...Gene...

...ken some rapid st...

...nill and a dozen derricks are up.

WONDER CONTINUES DRILLING RECORD

RICHFIELD, July 7. — The Wonder Co., Ltd., continues its record breaking drilling at Kraemer Home Place No. 2. Last week's work shows 700 feet drilled. It is understood that the Reed Roller bit is responsible for the fast time that is being made. No. 1 still stands at 1200 barrels and is also making a record for consistent production.

...ill on

"FASTEST ROCK CUTTING TOOL"

Los Angeles Evening Express
July 14, 1920

IN 1920 THE PERFORMANCE OF REED ROCK BITS AND REAMERS CALLED FOR THESE VOLUNTARY NEWS COMMENTS

BACK IN

1920

REED

ROCK BITS AND REAMERS WERE MAKING RECORDS FOR FAST—SAFE STRAIGHT FULL GAUGE HOLE

and TODAY in

1936

ARE MAKING RECORDS FOR FASTER . . . STRAIGHTER SAFER HOLE

REED ROLLER BIT COMPANY

One-third Natural Gasoline Industry's Income Used to Modernize Plants

After nearly six years of stagnation in the construction of new plants the natural gasoline industry has emerged from this depressing period and is now rapidly renewing its construction activities. Although some of the equipment used in the construction of new plants is being taken from plants in depleted areas it is estimated that the natural gasoline industry will expend approximately $25,000,000 during 1936 in new plant construction and in revamping existing equipment. This amount is considerably below the annual expenditures during the period from 1920 to 1930 during which the industry witnessed its growth to a major branch of the petroleum industry, but is substantially above the total of a year ago.

The larger amount of money being spent at present and estimated to be spent for equipment over the balance of the year is influenced by three important factors. First of these is the need to build new capacity to equalize the declining production in fields which are nearing depletion, this is particularly true since there appears to be little chance for stripping plant operations to be resumed in the Panhandle.

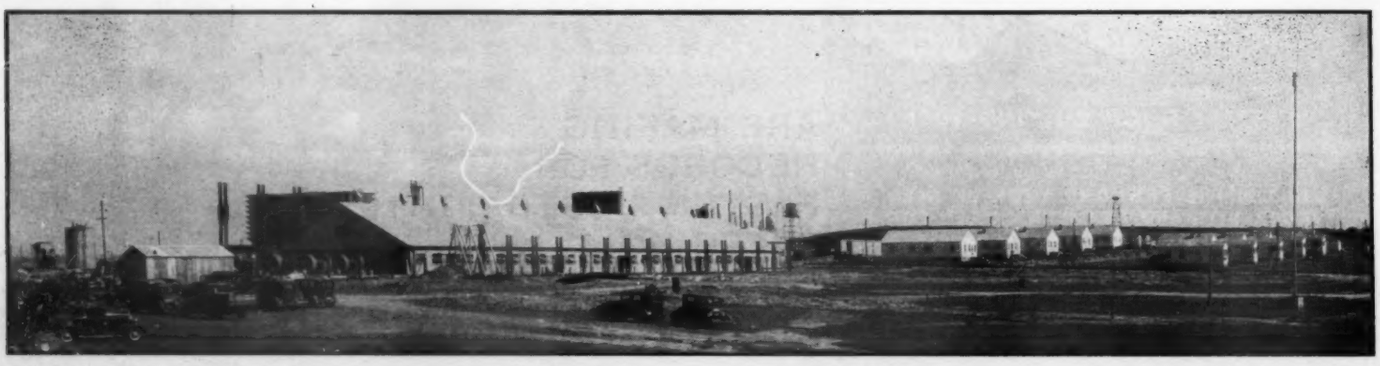
The second factor is that of needing to repair equipment that has been allowed to run down during the past six years of relatively poor prices and generally poor economic conditions. It is imperative that the industry maintain the $225,000,000 worth of equipment already operating and to do this the industry will spend close to $18,000,000 during 1936. Corrosion is an important factor in the need to replace valves, condenser bundles, absorber trays, etc., while manufacturers are finding it necessary to purchase major pieces of equipment including compressors as replacement units whereas a year ago there was an excess of such equipment to be salvaged from old plants. The third factor is the relative cheapness with which new plants may be constructed.

In an accompanying table are listed the more important construction jobs recently completed and now underway. It will be noted that much of the new work is located in the East Texas field and in its neighbor, the Rodessa field of Louisiana. In the East Texas area, the cost of gathering lines is a great factor and is about as high as the cost of the plant itself while in the Rodessa field this is not true, for in Rodessa there is a relatively high gas-oil ratio. For this reason, new plants are being built in the Rodessa area at costs as low as $5 to $6 per daily gallon of gasoline produced which means that a 30,000-gallon plant may be built for less than $200,000.

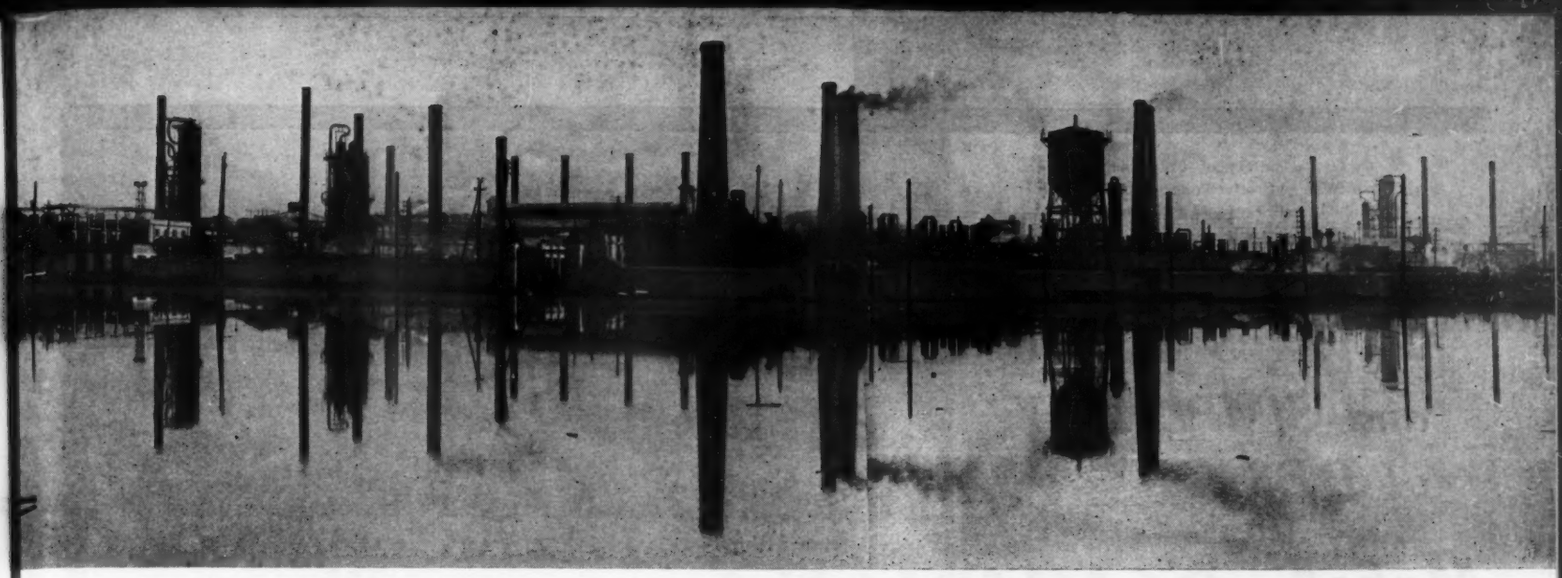
The present rate of construction is a decided change from that of even two years ago. At that time there were but few new plants being constructed and the general trend was a weeding out of the small uneconomical plants. Now, however, while the abounding of small plants continues, the amount of new plant construction taking place is sufficient to keep the total manufacturing capacity of all plants about the same level. This fact is substantiated by the fact that during 1934 the number of plants declined 32 and the total capacity 332,192 gallons while in 1935 the number of plants declined 27 but the total capacity declined only 30,010 gallons. If the present rate of building is continued throughout the present year it is very probable that this procedure will be reversed and the total manufacturing capacity increased.

Natural Gasoline Plant Construction Now Under Way or Recently Completed

Company—	Location of plant—	Nature of work—
Anzac Oil Corp.	Coleman County, Texas	Two 80-horsepower compressor plants.
British-American Oil Co.	South Turner Valley, Alberta, Canada	New 65,000,000-foot gasoline plant.
Continental Oil Co.	Near Eunice, La.	50,000,000-foot daily capacity plant.
Deep Oil Development Co.	Chalk Hill pool, Archer Co., Tex.	New 3,000,000-foot plant with five compressors.
East Texas Refining Co.	Rodessa field, La.	Erecting new plant.
Empire Oil & Refining Co.	Sasakwa, Okla.	Remodeled plant and added cooling and other equipment.
Gilliland Refining Co.	Kilgore, Tex.	Building new plant.
Glenrose Gasoline Co.	Rodessa, La.	New plant of 15,000,000-foot daily capacity.
Gregg-Tex Gasoline Corp.	North Gregg County, Texas	Butane and propane extracting column and adding to plant.
Gulf Oil Corp.	Ward County, Texas	Low pressure absorption type plant of 20,000,000-foot daily capacity.
Hanlon Gasoline Co.	Near Longview, Tex.	Adding to plant and erecting propane and butane extraction column.
Humble Oil & Refining Co.	Kilgore, Tex.	Added to plant capacity.
Humble Oil & Refining Co.	Rusk County, Texas	Installed new compressors, boiler and other equipment.
Manhattan Gasoline Co.	Plymouth field, San Patricio County, Texas	Constructing new 7,500,000-foot capacity plant.
Marr Natural Gasoline Co.	Sparks Survey, S.W. of Henderson, Tex.	New 2,000-gallon absorption-compression plant.
Mid-Continent Petroleum Co.	Holdenville, Okla.	Increase plant capacity.
Natural Gasoline Corp.	Galva, Kansas	New 25,000-gal. per day complete plant.
Parade Gasoline Co.	London, East Texas field, Texas	Increasing capacity, adding propane and butane extraction column.
Pelican Oil & Gasoline Co.	Rodessa field, La.	New 50,000,000-foot capacity absorption plant.
Phillips Petroleum Co.	Eunice field, N. Mex.	New 1-unit absorption plant.
Phillips Petroleum Co.	Oklahoma City, Okla.	Enlarging plant capacity.
Shell Petroleum Corp.	Lucien, Okla.	1,500-gallon absorption plant.
Shell Petroleum Corp.	Dominguez, Calif.	Remodeling plant and increasing capacity 20,000,000 feet daily.
Sinclair Prairie Oil Co.	Joiner area, East Texas field	New 12,000,000-foot capacity plant.
Sinclair Prairie Oil Co.	Seminole, Okla.	Increased plant capacity.
Skelly Oil Co.	South Burbank, Okla.	New 10,000,000-foot plant.
Skelly Oil Co.	Skellytown, Texas	Revamping and increasing plant size.
Superior Oil Corp.	Oklahoma City field	Increased plant capacity
United Gas Public Service Co.	Rodessa, La.	50,000-gallon capacity complete plant.



Phillips Petroleum Co. is enlarging its Naval Reserve plant in the Osage field of Oklahoma to make it a 25 unit plant. The 6 additional compressors are shown to the left of the compressor building which will be extended to house the entire group



General view of the Pyatakov Oil Refinery, one of the largest cracking plants in Baku, situated along an inlet of the Caspian Sea

Foreign Refinery Purchases

More equipment is being purchased for installation in refineries than is going into any other branch of the foreign petroleum industry. The amount of money to be spent for construction in foreign plants during 1936 will probably exceed $60,000,000, based upon the nature and extent of the work recently completed and now in progress. This estimate is based upon the accompanying list of construction work.

Contrary to the ideas of many, foreign plants are modernly equipped and because of the rapid expansion of foreign refinery operations in recent years, certain operations abroad are quite similar to those of the most modern in this country. This may be shown best in the two tables included here in which the construction work is divided. From these it is evident that both here and abroad the principal expenditure is for cracking equipment. The second largest amount being spent is for distillation equipment while solvent refining and solvent dewaxing rank third. As yet, polymerization has not become of special interest to foreign refiners. Although the chemistry and physical changes that take place in polymerization are probably as well understood abroad as here, there is not the need for commercial plants as in this country. As cracking becomes a more important part of foreign refinery operations, the foreign interest in polymerization will become as pronounced as here.

Tankcars and Tankers

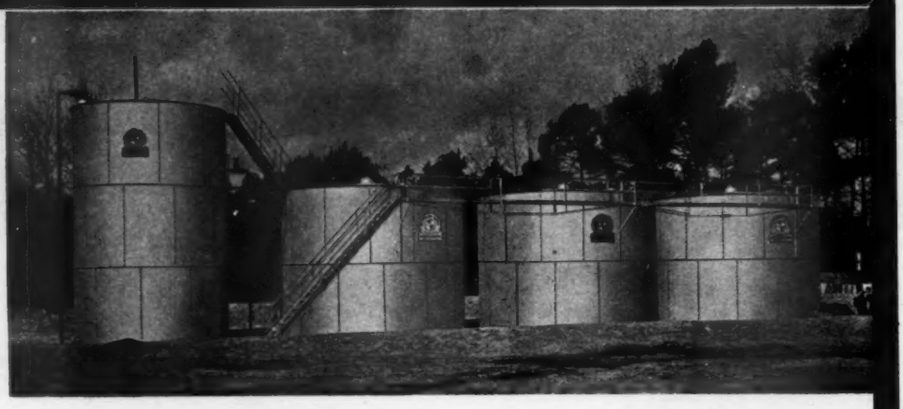
Expenditures for the normal maintenance of the oil industry's fleet of 140,000 tankcars and 751 vessels and for the building of replacement units will total approximately $43,000,000 this year. From year to year the amount of money spent for equipment and supplies by these divisions of the industry varies depending in part on the quantity of oils moved in export.

Over the past five years this country has witnessed the decline of its oil exports and relatively low tanker rates have been strong influences in keeping the building of new tankers below the normal rate. However, this set of conditions is giving way to the resumption of export trade and the forced replacement of obsolete and worn out tankers on a rather large scale so that within the new year total expenditures could easily exceed the estimated figure shown above.

Major Foreign Refinery Construction Under Way or Recently Completed

Company—	Location of refinery—	Nature of work—
Anglo-American Oil Co., Ltd.	Ellesmereport, England	10,000-gallon batch distillation unit to manufacture specialties.
Anglo-Iranian Oil Co., Ltd.	Abadan, Iran	25,000-bbl. pressure distillate stabilization unit. 35,000-bbl. combination unit. 24,000-bbl. two naphtha reforming units. 60,000-bbl. topping and vacuum unit.
Anglo-Iranian Oil Co., Ltd.	Courchelettes, France	2,000-bbl. cracking unit.
Asiatic Petroleum Co.	Curacao, D.W.I.	2,400-bbl. topping and cracking unit.
Assam Oil Company, Ltd.	Chittagong, Burma	60,000-gallon pressure distillate stabilization unit.
Assam Oil Company, Ltd.	Digboi, India	3,500-bbl. cracking furnace.
Azienda Generale Italiana Petroli	Venice, Italy.	10,000-bbl. atmospheric crude unit.
British American Oil Refineries, Ltd.	Turner Valley, Alta, Canada	30,000-gallon pressure distillate stabilization unit. 3,000,000-foot absorber.
Burma Oil Co., Ltd.	Rangoon, Burma	Rebuilding atmospheric crude unit.
Cie. Francaise De Raffinage	Gonfreville, France	2,800-bbl. naphtha reforming unit.
Cie. Francaise De Raffinage	Martiniques, France	3,500-bbl. combination cracking, reforming and stabilizing unit.
Curacaosche Petroleum Industry, MIJ.	Curacao, D.W.I.	Two 9,000-bbl. cracking furnaces.
Diadema Argentina Sociedad Aninima De Petroleo	Buenos Aires, Argentina	3,200-bbl. cracking furnace for naphtha reforming.
Egyptian Government	Suez, Egypt	1,500-bbl. atmospheric crude unit.
Galicja Gal. Tow. Naft S. A.	Drohobycz, Poland	2,000-bbl. two-stage atmospheric and vacuum distillation unit.
Gerwerkschaft Deutsche Erdol Raffinerie	Hanover, Germany	Complete lube oil refinery.
Gutehoffnungshutte	Oberhausen, Rhinland	820-bbl. cracking furnace.
Herbert Green & Co., Ltd.	E. Halton, Lincolnshire, England	Complete lube oil refinery; acetone-benzol dewaxing unit.
Hydrierwerk Scholven Atkengesellschaft Gelsenkirchen	Bauer, Germany	Two 5,000-bbl. furnaces for hydrogenation unit.
Iraq Petroleum Co., Ltd.	Kirkuk, Iraq	Three 44,000-bbl. crude stabilization units.
McColl-Frontenac Oil Co., Ltd.	Montreal, Canada	2,000-bbl. reforming furnace.
Midland Tar Distillers, Ltd.	Oldbury, England	Two 1,000-bbl. distillation units.
Naamlooze Vennootschap De Bataafsche Petroleum	Maatschappij, Pladjoe, D.E.I.	9,000-bbl. reforming unit.
Nead Oil Refineries, Ltd.	Owen Sound, Ontario	750-bbl. cracking unit.
Shell Petroleum Co.	Shell Haven, England	1,300-bbl. benzol-acetone dewaxing unit. 2,000-bbl. solvent refining unit.
Societe Lyonnaise Des Schistes Bitumineux	Chantiers de La Loire, France	2,000-bbl. cracking unit.
Societe De Raffinage Des Hulles De Petrole	Courchelettes, France	1,750-bbl. vacuum distillate unit.
Socony-Vacuum Oil Co., Inc.	Hamburg, Germany	500-bbl. acetone-benzol dewaxing unit.
Socony-Vacuum Oil Co., Inc.	Naples, Italy	500-bbl. benzol-acetone dewaxing unit. 4,200-bbl. topping and vacuum unit. 3,600-bbl. cracking unit.
Soo Refinery, Ltd.	Weyburn, Saskatchewan	Complete new refinery.
Standard Oil Co. of British Columbia, Ltd.	Burnaby, B.C.	2,000-bbl. light oil-fuel oil refinery.
Tatsumi Oil Co.	Tatsumi, Japan	500-bbl. vacuum unit.
Tropical Petroleum Co.	Barranca, Colombia	6,000-bbl. two-stage distillation unit.
U.S.S.R. Government	Ufa, Barkerian Republic	12,000-bbl. refining unit; two-stage distillate unit; cracking unit, reforming, treating and rerun facilities.
Administracion Nacional De Combustibles	Montevideo, Uruguay	4,000-bbl. complete refinery.

● *(Right)* A battery of Columbian Bolted Tanks with an interesting installation of Columbian walkways and stairways.



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Outstanding in *all the essential features* . . . strength, rigidity and simplicity of design . . . Columbian Stairways and Walkways actually give you more for your money today, tomorrow and for years to come! Being of the suspension bracket type they are adaptable for *all* tank installations. With this bracket construction no ground supports are needed, and Columbian brackets are so made that they are easily adjusted for tanks of different levels.

Adjustable to Meet Your Needs— Purchased for a definite tank installation today, Columbian Walkways can be used when this same installation is altered or on a different tank battery grouping. They are of sectional construction in 4-foot, 6-foot and 8-foot lengths. From these standardized units walkways, branch walkways, etc., may be made up to meet your specific requirements. At any time other units can be added if desired, or removed, and the whole stair and walkway assembly may be dismantled and reassembled.

●*(Above)* Here is a closeup of the Columbian walkway, bracket and stairway assembly, showing simplicity of design and strength of construction.

Simple to Erect—Columbian walkways are especially simple to erect as bolt holes in all parts are punched on standardized centers so that they always meet perfectly wherever the parts are joined together. Identifying marks are stamped into the metal of all parts, insuring quick and accurate assembly.

Strong and Rigid—Brackets are made of 4-inch channel of 5.4-lbs. weight per foot and bolt directly to the tank. Walkways are made of 12-gauge copper bearing steel. Sides and ends of each unit are flanged down 4 inches and 4-inch Z-bars are welded to these flanged-down sides. Walkways are further reinforced and strengthened by ⅝-inch truss rod supports. Will never sag; always rigid and symmetrical.

Stair and walkway assemblies are furnished either hot dip galvanized or painted . . . either with standard Columbian perforated non-skid treads or with arrowhead grating. Double hand rails for added safety.

●*(Below)* Closeup view of Columbian stairway and walkway construction, simple and easy to erect. Note that all parts are punched on two-inch centers.

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See pages 385, 386, 387 and 388 in the 1936 Composite Catalog for full data about Columbian Bolted Tanks.

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PIPE LINE STATISTICS

Oil Trunk Pipe Lines	58,240 miles	52%
Gathering Systems	53,760 miles	48%
Total length of pipe lines	112,000 miles	
Proportion in Interstate Systems	89,600 miles	80%
Total Capital Invested	$900,000,000	
Estimated new investments for Materials and Supplies.		
In new pipe lines	$ 35,000,000	
Upkeep of present lines	15,000,000	
Approximate total purchases	$ 50,000,000	

To transport by pipe lines the greater part of the 1,000,000,000 bbls. of crude to be produced in 1936 will require the purchase of equipment and supplies valued at $50,000,000. This figure is based upon actual expense for maintenance of present lines and for laying new lines, some of which have been announced during the first four months of this year.

The Oil and Gas Journal in its weekly reports in the first four months has listed approximately 47 oil pipe line projects varying from small gathering systems a few miles in length to major undertakings involving expenditures of millions such as Continental Oil Co. of Ponca City, Okla., spending $650,000 for line from Geneseo to Valley Center, Kans.; Shell Oil Co. of California, $4,500,000 for line from Bakersfield, Calif., to the San Francisco Bay district; Valley Pipe Line Co. from Kettleman Hills to Estero, Calif., at a cost of about $2,000,000; Standard Oil Co. (Indiana) $3,500,000 for new pipe line work immediately and numerous other projects involving from $10,000 to $1,000,000 each.

About nine gas line projects have been listed with the 230-mile 22-inch natural gas line from Zionsville, Ind., to Detroit, Mich., an estimated outlay of $16,000,000. This line is to be laid by Michigan Gas Transmission Co., subsidiary of Columbia Gas & Electric Corp. and about half

the amount will increase the capacity of the Panhandle Eastern Pipe Line Co. which delivers the gas from the Panhandle, Texas, field. Some 100 miles of 14-inch pipe line from northern Pennsylvania to Rochester, N. Y., are to be laid by Godfrey L. Cabot, Inc., Boston, Mass. Other gas lines will involve the spending of from $500,000 to $1,000,000 or more each.

One gasoline pipe line system of major importance is under consideration involving about $2,500,000. It is estimated at least 50 per cent of the money recorded will represent expenditures for material and equipment, the balance labor and other items.

Based upon these expenditures the pipe line industry will expend between $30,000,000 and $40,000,000 for equipment and material alone this year.

In addition there is a constant spending of money for material and supplies to keep the 112,000 miles of pipe and gathering lines in first class operating condition. This 112,000 miles of lines is divided approximately 58,000 miles of main trunk lines and 54,000 miles in gathering and feeder lines.

These pipe line systems represent an investment of about $900,000,000 and based upon figures covering cost of materials and supplies required for the upkeep it is estimated 1.7 per cent will be spent for reconditioning or about $15,000,000 for manufactured goods.

This survey indicates the pipe line companies will spend for materials and supplies during 1936 a total of between $45,000,000 and $55,000,000.

Selling and Distributing Will Need $150,000,000 for 1936 Supplies

In selling and distributing more than 115,000,000 gallons of petroleum products daily during 1936 the oil industry will spend a minimum of $150,000,000 in equipment and supplies with large number of manufacturers representing many industries. This total does not include purchases involved in gasoline pipe line and water transportation.

The following table lists some of the estimated purchases in marketing equipment for bulk and retail station operations in 1936:

	Number
Power and hand operated pumps	85,000
Lubricating oil and misc. pumps	115,000
Air compressors	40,000
Rotary lifts	30,000
Greasing units	25,000
Small tanks	75,000
Car washing units	20,000
Paint (gallons)	1,000,000
Trucks	30,000

This table covers only the more important items of equipment and supplies. Records of purchasing departments, which with government data are the basis for the above estimates, reveal hundreds of small items used in the construction, maintenance and operation of stations. Wiping rags, flood-lights, all types of signs, grease guns and numerous supply items total in the millions for the entire industry. Most companies have widened their station operations to include a partial or complete line of automobile accessories and this service requires special handling equipment. The purchase of maps and other information for tourists now runs above a million dollars yearly.

The $150,000,000 estimate includes cost of building supplies in the construction of new stations and maintaining those already in operation. New station costs range from a few hundred dollars for some of the small stations along the main highways to $50,000 or more for equipment and materials used in the building of some of the more elaborate filling stations of the larger cities.

The government estimates there are 170,000 of these drive-in filling stations and the same authority says there are approximately 27,000 bulk stations. The bulk stations serve the drive-in stations along with approximately 150,000 other type stations. The latter for the most part are one to three pump curb type units which do not offer the facilities of the drive-in stations. The estimated investment in all bulk and retail stations in United States is $1,250,000,000.

Available information indicates that one of the most extensive station construction and rebuilding programs in the history of the industry is now under way. This program started the latter part of last year with improved marketing conditions. This is explained as due to the more favorable leasing terms available compared to conditions in the late twenties, coupled with the fact that gasoline and motor oil customers go to the stations which are modern in design and have the latest servicing equipment.

It is estimated that $2,000,000,000 is invested in wholesale and retail marketing properties and the transportation and other incidental facilities used in their operation. The following table gives the average daily gallonage of the principal products of refinery operations for 1936 whose distribution will be handled through these marketing facilities:

	Daily average	Per cent domestic
Gasoline (inc. special naphthas)	57,000,000	91.2
Fuel oil and gas oil	46,000,000	92.0
Kerosene	6,600,000	87.0
Lubricating oil	3,200,000	70.0
Road oil	230,000	100.0
Wax (lbs.)	1,480,000	45.0
Coke (tons)	4,000	100.0
Asphalt (tons)	9,300	100.0

It is customary in gauging the equipment market in the marketing end of the oil business to consider only those facilities which are used in the sale of gasoline and motor oils. The above data show these two products account for only 50 per cent of the total refinery output. There are, for example, 5,000,000 rural homes to be served throughout the year with retail or tank-wagon deliveries of kerosene and several hundred thousand homes in the small towns and cities which use kerosene for heating and illumination. There are more than 1,000,000 owners of homes, apartments, hospitals and other buildings which required furnace oils or some grade of fuel oil for heating throughout all or part of the year.

In addition, there are tens of thousands of industrial, marine, railway and other consumers of heavy oils which depend on the marketing branch to supply their fuel requirements. In addition to the owners of 25,000,000 motor vehicles in this country, refiners supply lubricants for all the industrial and farm operations, the total accounting for 35 to 40 per cent of the lubricating oils production. Petroleum asphalts and road oils are distributed in all states. It is estimated there are more than 10,000 buyers of petroleum wax in this country.

Aside from the domestic demands, most of the refinery products have outlets in foreign countries as shown in above table. The marketing of these products in many cases requires special equipment, which is an important item in the total costs.

When the distribution of petroleum products is traced to the final consumer it is apparent that practically all of the families of this country are buyers of one or more products. This accounts for the fact that, with the demand for most petroleum products expanding, the oil industry will spend approximately $150,000,000 in 1936 for equipment and supplies.

View of the Texas Company's furfural refining and dewaxing unit at the Port Arthur, Tex., refinery

The Solvent Dewaxing Process

By W. P. Gee, W. Kiersted and B. Y. McCarty
The Texas Co., New York

In a paper entitled "Solvent Dewaxing of Oils with Benzol and Acetone," presented before the American Petroleum Institute, May 17-18, 1933, Govers and Bryant gave a general discussion of the operation of the solvent dewaxing process installed at the Lawrenceville, Ill., refinery of the Indian Refining Co. This installation was made in 1927, and was the first of its kind. The past three years have, in response to urgent demands from the industry, witnessed rapid and important progress in the development of commercial operating equipment. The purpose of this paper is briefly to review this development, to explain the reasons for the phenomenal expansion of the process to those not already familiar with its operation, and to point out the essential requisites of an economical dewaxing installation.

Public demand for low-pour-test oils of high viscosity index has brought refiners comparatively recently to the realization that the older methods of dewaxing must be replaced by a more efficient process—one that would fulfill the following requirements:

1. Produce from waxy stocks the maximum yield of wax-free oil consistent with normal stock fluidity and having the desired pourpoint.
2. Be suitable for dewaxing any lubricating stock.
3. Permit switching from one stock to another with a minimum loss of time or contamination of products.
4. Be economical to operate.
5. Be low in initial cost.
6. Be flexible in design, so as to permit expansion of the plant to meet any increase in demand for products.
7. Be so advanced in fundamental theory as to obviate obsolescence, by providing a dewaxing system that will permit incorporating into existing plants processing improvements that may be evolved from research and the wide application of the process throughout the industry. All of these requirements are met by the solvent dewaxing process.

1. Maximum Yield Obtainable

A maximum yield of dewaxed oil is insured by two fundamentally sound principles: (1) the use of a solvent which can be accurately controlled as to solvent power in order to permit complete separation between wax and oil solution; (2) the use of filtration to separate sharply by mechanical means the precipitated wax crystals from the chilled oil-solvent solution.

The process in its present commercial form employs a mixed solvent including an oil solvent, chemically related to the oil, which will retain the oil in complete solution at the dewaxing temperature but will not exert excessive solvent action upon the wax content; and a wax antisolvent, chemically dissimilar to the oil, which will effectually eliminate any tendency of the wax to remain in solution at the dewaxing temperature. The wax antisolvent, in addition to promoting crystal growth and wax precipitation, is also a material aid to filtration by reducing the viscosity of the oil solution.

Unfortunately for the industry, the solubility of different oils and different waxes is not the same. If this were the case, a single solvent possessed of sufficient selectivity to serve in itself as a solvent and antisolvent might be suitable for all dewaxing purposes. Generally speaking, however, the higher the viscosity and the greater the so-called paraffinicity of an oil, the lower will be its solubility. The difficulty of securing a single solvent that will serve equally well for dewaxing all oils becomes at once apparent. A correct mixture of several solvents, on the other hand, permits a clean separation of oil solution from wax crystallized at any desired temperature of filtration.

Commercial 90 per cent benzol is now used as the most suitable oil solvent due to its high solvent power for oil, low wax solubility, stability, and availability in commercial quantities at low cost. The ketones possess excellent properties as wax antisolvents. Of these methylethylketone and acetone are the two wax antisolvents now generally employed in commercial application of the process. Either can be used in any case, and the selection between the two is generally a matter of operating or investment economy.

***A.P.I.*—Presented Mid-Year meeting of American Petroleum Institute, Tulsa, May 15, 1936.**

The process is characterized by high yield of wax-free oil and low dewaxing differential (difference between dewaxing temperature and pour test). Plants now in operation dewaxing to 0° F. pour test demonstrate that the wax cake removed by filtration contains practically 0° F. pour test oil. The practically complete separation of wax is accomplished, moreover, at a temperature substantially the same as the pourpoint of the dewaxed oil desired. Filters afford the fundamentally sound means of mechanically separating the wax-free oil solution from wax, since the wax cake when formed on the filter medium can be removed from the unfiltered solution, and any oil solution retained in the cake can be washed through to the filtrate system. High yield is of growing importance because of the tendency toward solvent refining, which increases the value of dewaxing-plant charge stocks.

The ability to produce the maximum yield of low-pour-test oil at a temperature substantially the same as the pourpoint has thus been commercially demonstrated.

2. Dewaxing Stock

All types of stocks from gas oil to heavy residua have been successfully dewaxed on a commercial scale by the solvent dewaxing process. Table 1 is presented to illustrate some of the stocks handled in commercial units. Suitability of the process to any type of wax-bearing oil is thus shown.

3. Stocks Changed Quickly

Commercial operation has demonstrated that a minimum of time is lost, and no contamination of products need result, when switching from one stock to another. Dewaxing processes which involve slow chilling, or which for other reasons require the presence of a considerable amount of stock in process tankage or equipment, naturally require appreciable time to replace one stock with another. The solvent dewaxing process, however, being conducted as a continuous operation in which rapid and continuous chilling is desirable, permits the use of chillers, filters, process tankage, and solvent-recovery equipment having a minimum volumetric capacity, in which the total stock oil in the complete system can easily be reduced to two hours' supply. Complete displacement of all liquid in the dewaxing plant can, therefore, be accomplished quickly. It is possible to terminate a run

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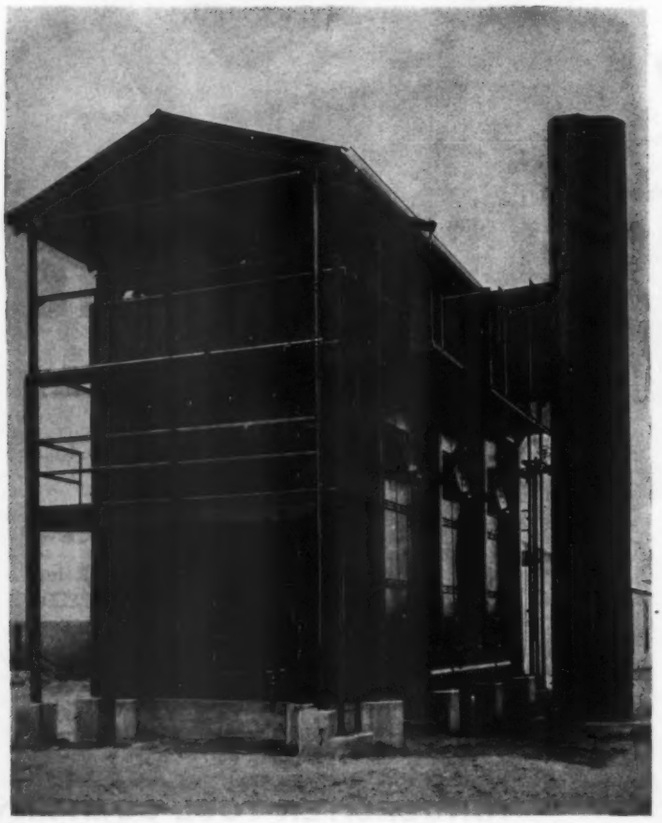

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on one stock, wash the system with slovent, and be on stream dewaxing of a dissimilar stock within a very few hours at the most. In the case of similar stocks, where cutting by viscosity can be permitted, the change-over can be made without any loss of time.

4. Economical Operation

Improvements in design of equipment have been attended by reduction in operating cost. The cost of power for pumping is now lower due to material reductions in pressure drop through improved refrigeration and heat-transfer equipment. Heat, in the form of steam or fuel, that is required for recovery of solvent from the wax-free oil solution, has been reduced by the introduction of the principle of multiple-effect evaporation, and by the use of additional exchangers. Refrigeration requirements have been reduced by more complete and efficient recovery of refrigeration from filtrate solution and slack-wax mixture. A reduction in operating labor has been accompanied by additional control instruments, by the use of large filters, and by more convenient arrangement of piping and auxiliaries. Solvent loss has been reduced from 0.2 per cent to approximately 0.05 per cent of solvent turnover. The rapidity with which solvent in the system is turned over has been increased from one turnover in 12 hours to one complete re-use of the solvent every two or three hours.

As a result of economies in plant operation the unit cost of dewaxing has been reduced more than 50 per cent in the past three years.

5. Plant Investment Low

Plant investment costs are low due to the fact that no special equipment of any kind is required; operating pressures are low; no corrosive liquids are employed; solvent-to-oil ratios for dewaxing solutions are low; and plant design is so flexible as to permit utilization to the fullest extent of local conditions or facilities such as refrigeration, conventional chillers, process tanks, etc., that may be available. The arrangement of equipment follows no set standards, since space requirements are comparatively small and the necessary tankage, towers, buildings, etc., can be arranged to suit almost any local requirement. Recent improvements in design, already mentioned as effective in reducing operating costs, have also served to reduce construction costs as well.

6. Economical Expansion of Plant Possible

Equipment employed by the solvent dewaxing process can be purchased in large or small units. Because of the wide range in equipment sizes and the more or less unit type of construction used, capacity requirements need not be anticipated far into the future. It is sufficient to provide only for meeting immediate demands; since, with nominal provisions for expansion, the plant can be easily extended when and if sales requirements demand additional production.

Filters are available having capacities to handle from 100 bbls. to over 400 bbls. per day of oil charge each. The capacity of double-pipe chillers ranges from approximately 75 bbls. to 200 bbls. per day each, depending on size and the amount of solution solvent to be chilled with the oil. Refrigeration machines are available in almost any size desired. It is of major importance when considering provisions for future requirements that the principal items of equipment are available as units that can be operated in parallel with similar units originally installed.

7. Insurance Against Obsolescence

The vast amount of research work already conducted in conjunction with commercial plant development, together with a general acceptance by the industry, furnish a secure basis from which the solvent dewaxing process looks to the future with every assurance of retaining its place as the universal dewaxing process.

Recent Changes in Plant Design

Figure 1 presents a simplified flow diagram illustrating the flow of oil and solvent through a typical solvent dewaxing plant. The general flow and operation of the process were described in detail in the paper by Govers and Bryant, and consideration will be given here only to those points which have been changed in recent installations.

The original installation of the process by the Indian Refining Co. employed batch mixing in preparing the charge solution. All subsequent installations have been equipped with a continuous-mixing device. Just ahead of this mixer the oil and solvent streams, respectively, are controlled by means of a ratio-flow controller so as to insure a continuously-uniform solution. Dewaxing operations were smoothed out appreciably by this change.

A solution temperature of the order of 100° F. to 120° F. is all that is ordinarily required. Temperatures from 50° F. to 60° F. above the complete solution temperatures have been found desirable, however, in preparing certain oils for dewaxing. Both filter rates and yields can be improved when handling these oils, by heating the solution to a "super-solution" temperature, after which the combined charge may be immediately cooled. A steam heater installed in the charge line followed by a water-cooled after-cooler are the only additional pieces of equipment necessary to effect the initial heating and cooling operation.

The original installation of the process involved the use of two brine solutions at different temperatures for chilling the charge solution from exchangers. This chilling method has been replaced in all newer installations by direct ammonia-ex pansion chilling, the ammonia being supplied by either absorption or compression machines. The final double-pipe chiller is automatically controlled to give the desired dewaxing temperature. Brine chilling is unnecessary, although an existing brine system may be used as a matter of investment economy.

Two types of filters have been applied to solvent-dewaxing operations, viz.: continuous drum-type vacuum filters, and rotating-leaf pressure filters. Improvements in the design and construction of both the rotating-leaf pressure filters and drum-type vacuum filters permit the use of insulated filter shells instead of requiring insulated cold rooms previously used for filter installation. This has not only reduced construction costs, but has also improved operating conditions.

Whereas the original pressure filters used in the Indian Refining Co. installation have a filtering surface of only 360 square feet per filter, pressure filters now in use have a filtering surface of 800 square feet, materially reducing the number of separate filters required and correspondingly the operating labor. Continuous-vacuum filters used in

TABLE 1—SOLVENT-DEWAXING RESULTS

Stock	Raw Light Coastal Distillate		Raw North Texas Residuum		Raw Oklahoma Residuum		Raw Pennsylvania Long Residuum		Raw Pennsylvania Distillate		Raw Kettleman Hills Distillate	
Source	Coastal		Mid-Continent		Mid-Continent		Pennsylvania		Pennsylvania		California	
Solvent composition:												
Acetone, per cent	...		...		...		...		...		50	
Benzol, per cent	50		45		45		60		60		50	
Toluol, per cent	...		...		...		...		...		...	
Methylethylketone, per cent	50		55		55		40		40		...	
Yield of wax-free oil, per cent	99.0		78.0		88.0		85.0		82.0		84.0	
Dewaxing temperature, deg. F.	—40		+10		—12		—10		—10		—5	
Tests:	Charge Oil	Wax-free Oil	Charge Oil	Wax-free Oil	Charge Oil	Wax-free Oil	Charge Oil	Wax-free Oil	Charge Oil	Wax-free Oil	Charge Oil	Wax-free Oil
Gravity, deg. A.P.I.	27.3	26.0	22.3	19.4	23.6	22.4	28.3	27.3	34.0	31.2	19.8	17.0
Flashpoint (Cleveland open cup), deg. F.	280	290	545	540	440	450	435	420	290	365	435	430
Fire point (Cleveland open cup), deg. F.	305	325	625	630	500	505	480	500	390	410	505	505
Viscosity, Saybolt Universal, at 100 deg. F.	58	63	6,000	....	1,200	1,644	590	730	80	107	1,050	2,500
Viscosity, Saybolt Universal, at 210 deg. F.	....	....	271	300	90	102	74	76	38	40	74	95
Color	....	....	Dark	Dark	Dark	1 Tag-Robinson (Dilute)	Dark green	Dark green	3¾ Tag-Robinson	9 Tag-Robinson	Green	Green
Pour point, deg. F.	—40	—55	+110	+15	+85	—5	+45	—5	70	0	110	0
Carbon residue, per cent	0.01	0.02	6.0	6.4	3.0	2.65	1.40	1.42	0.01	0.03	1.70	2.1
Viscosity index (Dean and Davis)	...	...	...	...	81	73	113	98	...	100	45	—14
Viscosity-gravity constant	0.864	0.864	0.831	0.852	0.840	0.847	0.809	0.815	0.813	0.824	0.875	0.892

Stock	Petrolatum		Solvent-refined Oklahoma Residuum		Solvent-refined Mid-Continent Distillate		Solvent-refined German Haenigsen Residuum		Solvent-refined Iraq Distillate		Solvent-refined Coastal Residuum	
Source	Mid-Continent		Mid-Continent		Mid-Continent		Germany		Persian-Iraq		Coastal	
Solvent composition:												
Acetone, per cent	...		...		35		30		35		...	
Benzol, per cent	60		50		52		65		65		60	
Toluol, per cent	...		...		13		5		...		...	
Methylethylketone, per cent	40		50		...		...		...		40	
Yield of wax-free oil, per cent	50.0		82.0		84.0		82.0		78		96.0	
Dewaxing temperature, deg. F.	—12		—10		—11		—12		—15		—5	
Tests:	Charge oil	Wax-free oil	Charge oil	Wax-free oil	Charge Oil	Wax-free Oil	Charge Oil	Wax-free Oil	Charge Oil	Wax-free Oil	Charge Oil	Wax-free Oil
Gravity, deg. A.P.I.	28.4	23.9	28.4	28.2	28.1	27.3	27.4	25.9	31.1	29.3	25.4	25.3
Flashpoint (Cleveland open cup), deg. F.	...	485	545	530	495	495	475	475	385	375	455	460
Fire point (Cleveland open cup), deg. F.	...	575	600	590	570	565	530	530	420	425	540	530
Viscosity, Saybolt Universal, at 100 deg. F.	...	2,068	1,350	1,550	625	755	630	804	...	176	1,265	1,272
Viscosity, Saybolt Universal, at 210 deg. F.	87	118	107	109	67	73	72	77	44	45	92	91
Color	...	¼ Tag-Robinson	Dark	Dark	40 (½-in. Lovibond)	27 (½-in. Lovibond)	10 Tag-Robinson (Dilute)	½ Tag-Robinson	1¾	1¼ Tag-Robinson	1½ Tag-Robinson	1½ Tag-Robinson
Pour point, deg. F.	112	—5	+115	0	+110	—5	+110	0	+110	—5	+25	—5
Carbon residue, per cent	...	1.4	0.32	0.32	0.08	0.10	0.40	0.46	0.13	0.15	0.47	0.48
Viscosity index (Dean and Davis)	...	77	99	90	85	82	102	91	...	100	80	77
Viscosity-gravity constant	...	0.832	0.800	0.801	0.813	0.817	0.816	0.818	0.808	0.819	0.826	0.827
Paraffin, per cent	42.0											
Melting point of paraffin, deg. F.	128											

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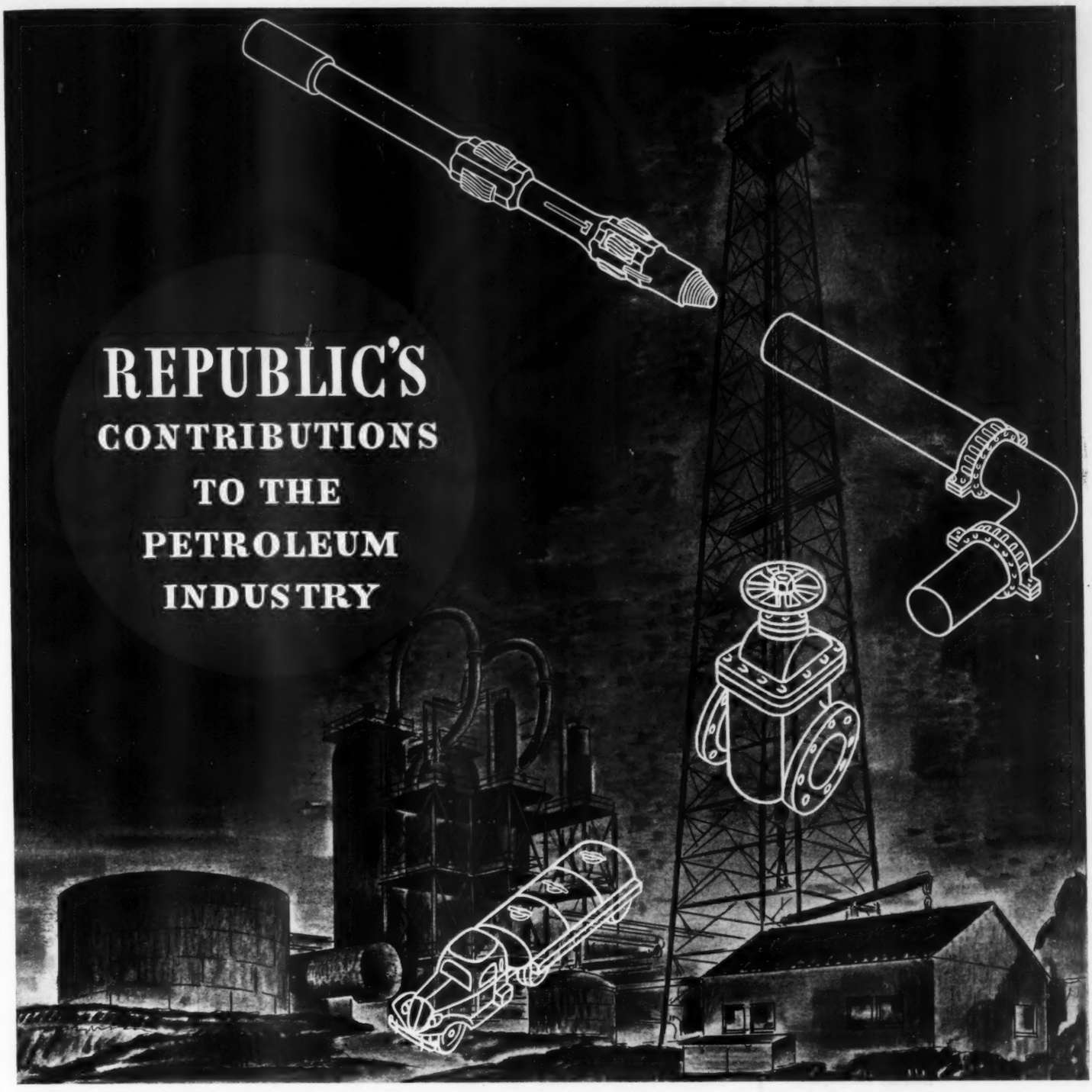

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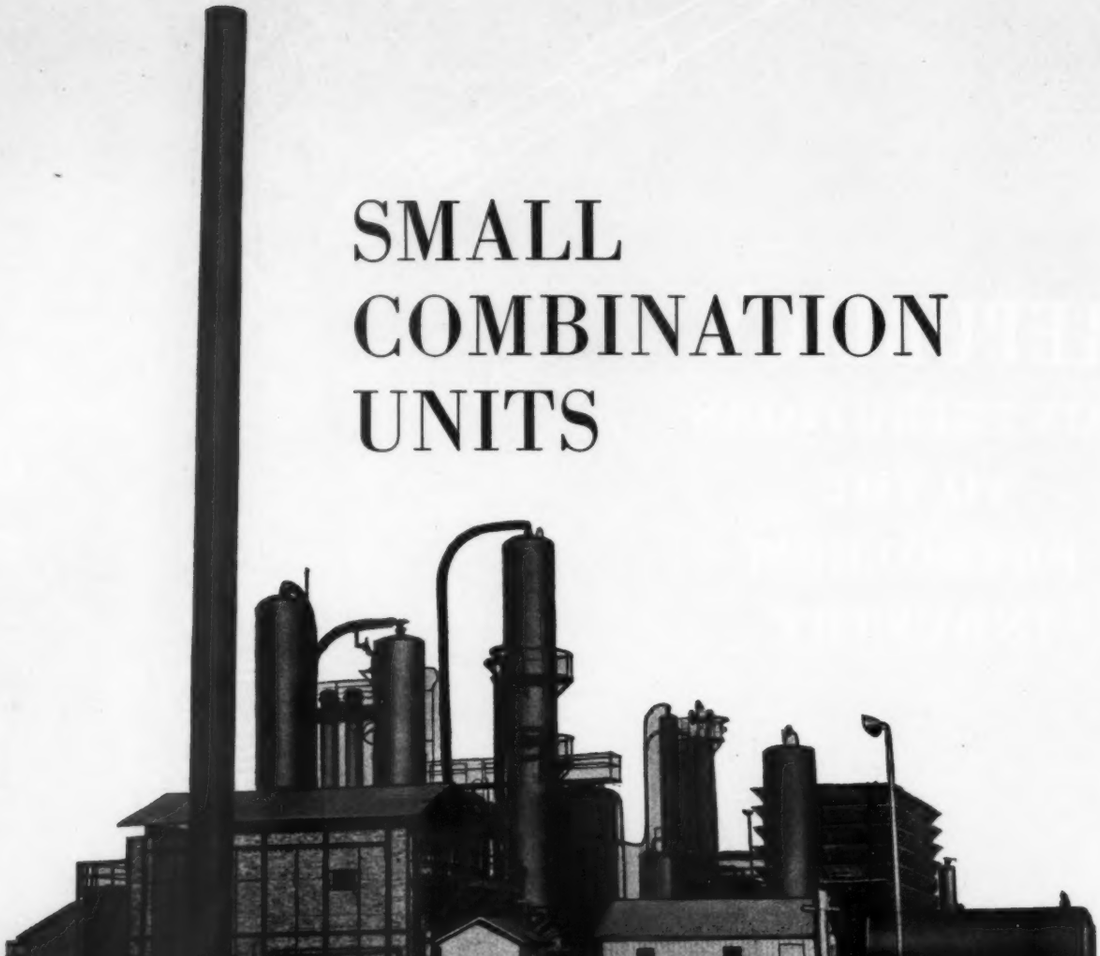

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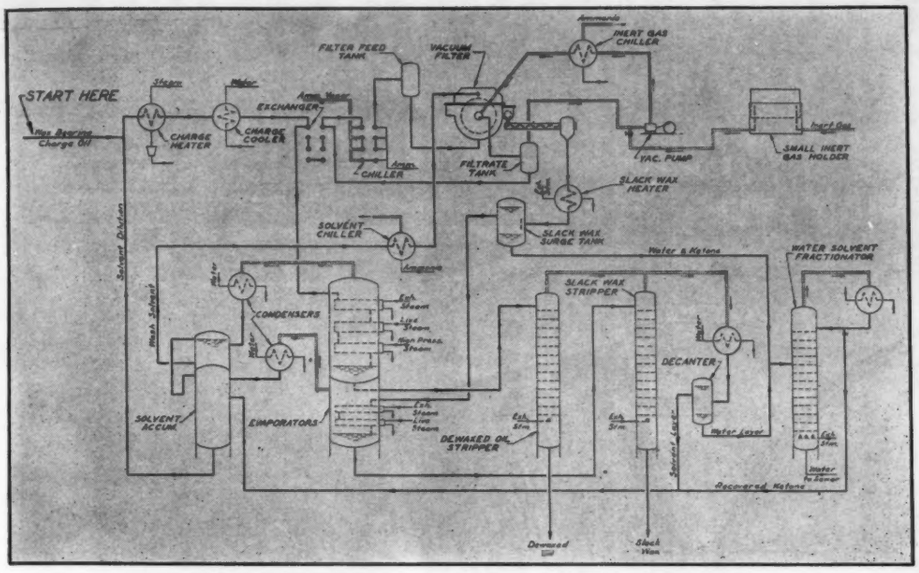


Fig. 1—Flow diagram, the solvent dewaxing process

dewaxing have 300 to 500 square feet of filtering surface, or more, as desired.

Probably the greatest operating improvements in the process have been accomplished by completely re-designing the original solvent-recovery system as used by the Indian Refining Co. In fact, there are now several designs that may be used with equal success as far as recovery of solvent is concerned.

Based upon the use of exhaust steam-heated evaporators, 80 to 90 per cent of the solvent can be recovered using exhaust steam furnished by steam-driven pumps and machinery. Figure 1 presents this type of recovery equipment, in which live steam is used to vaporize practically all of the solvent remaining in solution. The heated oil from the lowest tray contains approximately 0.5 per cent of solvent, which is easily removed in the conventional steam-stripping column. Solvent is recovered from the slack-wax and solvent mixture in essentially the same way.

In cases where electricity or other forms of power can be used to better advantage than steam for driving pumps and machinery, multiple-effect evaporators are used. Live steam or fired heaters serve to vaporize a substantial part of the solvent at low pressure. These vapors, in turn, are used to vaporize solvent from the filtrate solution at atmospheric pressure.

The process, therefore, affords the designer wide latitude in selecting an economical basis for design. A careful study of the economics involved in each particular case is, accordingly, made before proceeding with plant design.

The original method of drying solvent by the use of soda ash is no longer employed.

The removal of water from the solvent is now accomplished by fractionation. Figure 1 illustrates how excess water, which may enter the system with oil charge from the steam-stripping operation or from condenser leaks, is removed. The following explanation will serve to clarify the solvent-drying operation.

Water present in the charge concentrates almost exclusively as ice in the wax cake. To separate the major portion of this water, the slack-wax mixture is heated by exchange and direct heat to approximately 200° F., and allowed to settle. The excess water, containing solvent in solution, separates readily, and is withdrawn from the slack-wax settling and surge tank into a water accumulator for charge to the water fractionator.

Dry acetone or substantially dry methylethylketone is recovered from the water by direct fractionation as an overhead distillate. Water, free of solvent, is discharged to the sewer from the bottom of the tower.

The overhead distillate from the methylethylketone fractionator is a constant-boiling mixture of methylethylketone and water, containing 88.6 per cent methylethylketone by weight. On cooling to a temperature of 100° F., a small percentage of water solution separates out—increasing the percentage of ketone in the solvent layer to approximately 90 per cent by weight. The separated water layer is re-cycled to the fractionator. Several methods could be used to remove the remaining water from the constant-boiling mixture; but the volume of constant-boiling mixture produced is so small in relation to the total solvent volume that additional separation is not necessary—and it is, accordingly, mixed with the main body of recovered solvent.

It will be seen from the above brief discussion that there is practically no difference in the recovery system when using either acetone and benzol or methylethylketone.

Solvent Losses

The solvents employed must, in the interest of economical operation, be stable at the temperatures required in the recovery process, easily recoverable from the oil, and not chemically reactive with the oil. Acetone, methylethylketone, benzol, and toluol have excellent qualities in all three respects as substantiated by records of solvent loss attending commercial operation of the process over long periods of time. This over-all loss, including losses due to leaks, spills resulting from occasional carelessness, and similarly avoidable causes, amounts to only 0.05 per cent of the solvent turnover.

Precautions taken to keep losses to a minimum include the general use of welded lines and vessels, blanketing of solvent tanks with inert gas, and grease-sealed lantern glands on pump rods, chiller shafts, filter trunions, and similar glands through which solvent leakage might occur.

The inert gas is furnished by a separately fired generator at an average rate not exceeding 20 cubic feet per minute. The inert gas, besides serving as a solvent blanketing medium, is circulated by a vacuum pump from the vacuum filtrate receiver through chillers to the filters to facilitate wax-cake discharge and cake drying. Any inert gas escaping to the atmosphere does so through an oil seal which absorbs solvent that may be present. This oil, and that used in the gas holder, is passed through the solvent-recovery system occasionally to reclaim the solvent held in solution.

Conclusion

Thus it is shown that the solvent dewaxing process fulfills the theoretical and practical needs of the modern refiner. The most impressive evidence of the success of the process is the acceptance accorded it by the following representative companies of the petroleum industry now licensees of the process:

Indian Refining Co.
The Atlantic Refining Co.
Gulf Refining Co.
Herbert Green Co., Ltd.
Deutsche Vacuum Oel, A. G.
The Texas Co.
Raffineria di Napol, S. A. I.
Gewerkschaft "Elwerath"
Shell-Mex & B. P., Ltd.
Socony-Vacuum Oil Co. (Paulsboro, N. J.)
Quaker State Refining Co.
Socony-Vacuum Oil Co. (Olean, N. Y.)
Standard Oil Co. of California.

Dr. Ulric B. Bray Appointed as Asst. Manager of Research

Dr. Ulric B. Bray, research supervisor for Union Oil Co. and well known in scientific circles for the part he played in the development of propane solvent refining, by which a pure paraffin-base lubricating oil is made from western crudes, has been appointed assistant manager of research, in accordance with a bulletin just released by Dr. D. R. Merrill, manager of research for the company.

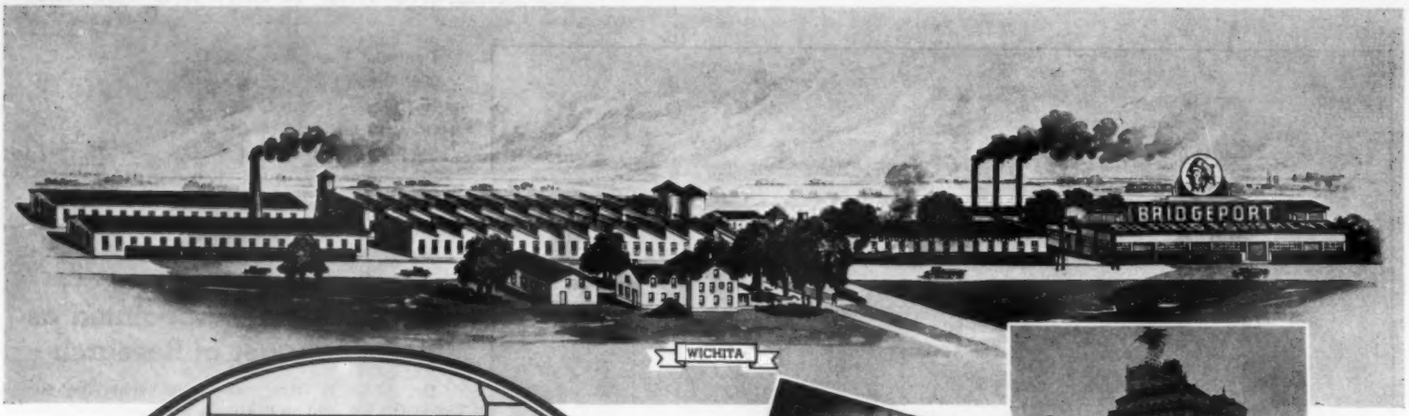
Doctor Bray is a graduate of Emory University at Atlanta, Ga., and received his doctor's degree in chemistry from Yale. Before coming to Union Oil Co., he was a national research fellow at California Institute of Technology, and was employed by the Atmospheric Nitrogen Corp., a subsidiary of Allied Chemical & Dye Corp.

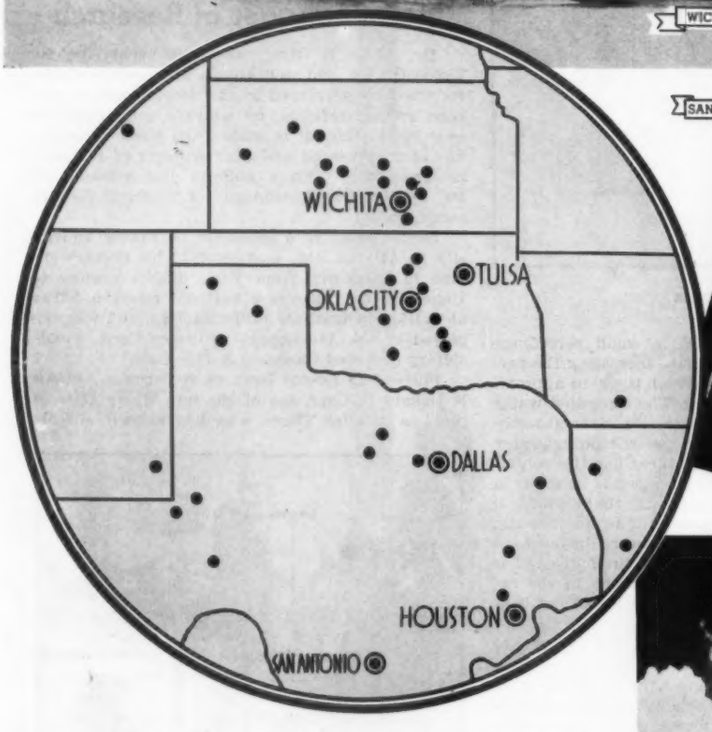
Succeeding Doctor Bray as research supervisor is Donald E. Carr, son of the late Harry Carr of the Los Angeles Times, who has himself already earned a fine reputation as a writer. Donald Carr is a native Angeleno, and attended Los Angeles High School. After leaving high school he went to Phillips Andover Academy, later returning to the University of California at Berkeley, from which institution he was graduated with the degree of bachelor of science in 1930. He associated himself with Union Oil Co. at that time, and was responsible for certain phases of the propane-solvent refining development.

Dr. Ulric B. Bray right, Donald E. Carr left

St. Thomas Gas Plant

ST. THOMAS, Ontario, May 16.—St. Thomas as Public Utilities Commission is again considering the changing of the municipal system from artificial to natural gas, as an alternative to an extensive program of renovation. The city is close to the main transmission lines of the Southern Ontario Gas Co., which supplies natural gas to a number of suburban areas.





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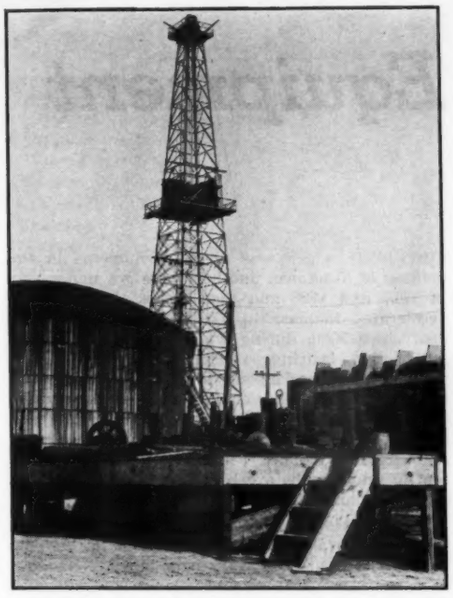


Well Designed Lease Dock

The lease dock shown here offers the advantage, due to its uniform arrangement, of having all the fittings and supplies clearly in sight, easy to find and quickly removable. The shelves placed at the back of the dock, which is located in the Oklahoma City field, are used to store small fittings and equipment that are easily lost if not orderly arranged. All partitions are marked with the size of the fittings kept there. The remainder of dock is used for storing supplies.

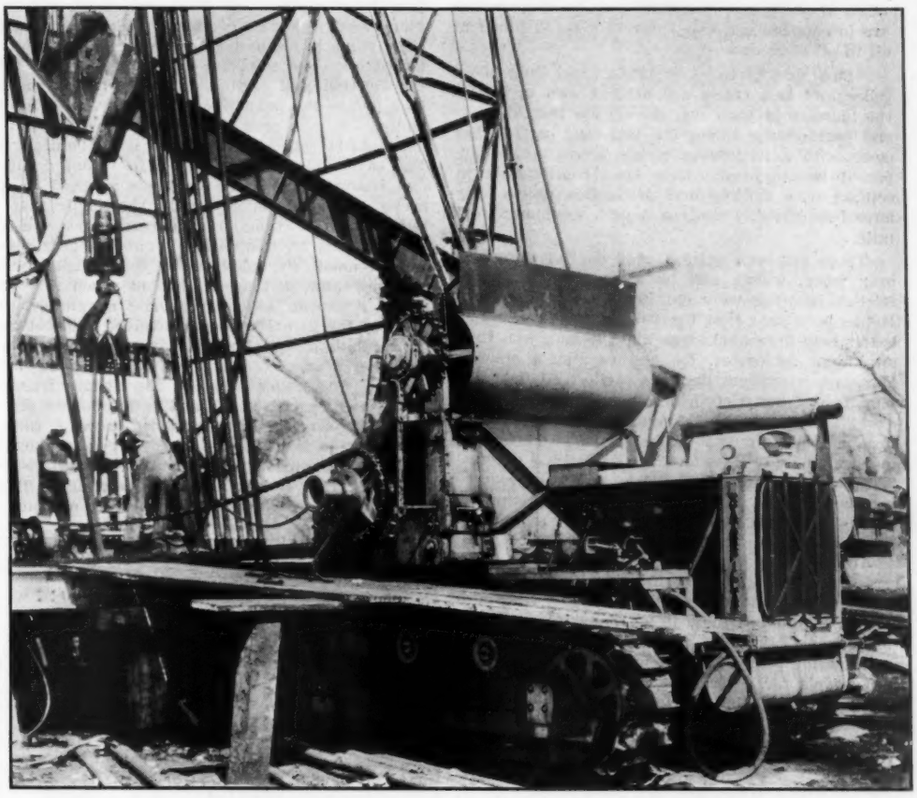
Elevated Cooling-Water Tank

The accompanying photograph illustrates how a small hill may be used to an advantage to insure having a reserve supply of

cooling water on hand in case the pumps transferring the water from the cooling pond to the tank are shut down. The large tank shown is the cooling water surge tank and is capable of holding 1,000 bbls. Thus if the water pumps are forced to shut down there is always available 1,000 bbls. of water for cooling the engines of the pipe line pumping station. Also the operators have taken advantage of the elevation offered by the surge tank for installing the tank containing the station's drinking water supply.

Portable Well Servicing Unit Mounted on Tractor

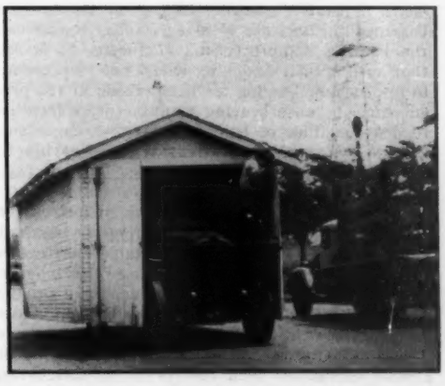
A California oil company takes advantage of the extreme portability of the unit shown in the accompanying picture to clean out and service their producing wells in that state. The tractor is equipped with a hoisting drum used for cleaning out, swabbing and well servicing, which includes pulling rods and tubing. The unit is also equipped with sprockets used to drive a small rotary table. Natural gas is used as fuel for the motor of the unit, a reservoir with low pressure regulator being fixed on the front of the tractor beneath the radiator. Flexible hose are used to connect the gas regulator to the field gas lines and also between the reservoir and motor, to forestall connections being loosened by the vibrations and movement, however slight, by the motor and the unit. The compactness and portability of the unit make it faster and more convenient to move from one job to



the next with a cost that is much lower than would be necessary to move a drawworks and engines of even the skid type units. The transmission of the unit and the jaw clutches used in the drawworks give the operator a wide range of gear ratios to choose from. This wide range of gears facilitates in speeding operations by keeping the work moving at the best possible speed and aids in securing the maximum efficiency of the motor.

One Way to Move Garages

A way to move a garage at a 40-mile an hour clip! This was snapped almost in front of the Capitol in the Mansion Hill Field, Oklahoma City where dwellings and garages are being rushed out of residential lots in order to make room for drilling sites. The



garage has been braced, strongly cross-jacked up and then lowered on the truck.

Ball and Roller Bearings Widely Used in Drilling and Pumping Equipment

By PAUL REED

Roller bearings and ball bearings are now used in drilling and pumping equipment to such an extent that it is easy to overlook the fact that it does not take a long memory to recall the time when these types of antifriction bearings which are in common use today were not to be found at all in oil field operations.

Since antifriction bearings, including both roller and ball types, are neither seen or heard, the increase in their use, during the last 15 years and particularly during the last four or five, has come with a steadiness which would not be apparent to many who have been continuously in contact with drilling and production unless they have been directly concerned with mechanical details.

There has been quite a good deal of argument over when, where, and by whom the first antifriction bearings were put in oil field equipment. It has been said that the first man to put roller bearings in drawworks was like the man who first swallowed an oyster. He had to take a chance. However, it appears that the earliest oil field application of antifriction bearings commonly heard about today was the introduction of roller bearings in drilling crown blocks in the years following the war (1919-1922). Deeper drilling encountered the problem of greater radial loads requiring more power to overcome inertia in starting and as a result a desire was stimulated to find an improvement over the conventional bronze bearing.

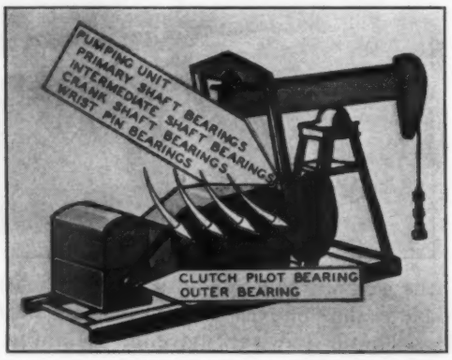
Although this is reputed to be the first oil field use of the products of antifriction bearing manufacturers, it cannot be considered the first use of roller type bearings, in as much as so-called "home-made" types of roller bearings have been an essential part of such equipment as rotaries and swivels for a long time. However, the possibilities of antifriction bearings in swivels were appreciated even before roller bearings were to be seen in crown blocks, and tests were being carried on with the object of determining their ability to meet swivel requirements.

Today some manufacturers use two or three different makes of antifriction bearings in the same swivel. Since ball bearings were found to be practicable where the thrust is light, ball bearings in swivels have been sometimes used to absorb upward thrust. Roller bearings are used to meet other bearing requirements in the swivel where there are heavy radial loads and subjection to considerable shock. In the days when antifriction bearings were pioneering in the oil fields, roller bearings for swivels were especially designed by the bearing manufacturer's engineers. It is said that such special designing would not be necessary to meet a new bearing problem arising at the present time, because bearing manufacturers have extended the lines of bearings made to cover such a wide range of applications that a bearing for any need can be selected from stock bearings regularly made by different companies.

As yet the antifriction bearing manufacturers have not provided bearings to replace the balls and cones used in the main or table bearings of the rotary because the sizes of these bearings are too large to be practicable for commercial production by them at the present time. Beyond a certain size, cost is prohibitive for antifriction bearing manufacturers unless the product be made in greater quantities than the rotary manufacturing industry can now absorb. A marked increase in demand coupled with uniformity of requirements would be needed to get bearing makers into this field. Bearing makers, furthermore, make the general comment that standardization of shafts would lead to a reduction in the price of bearings.

The introduction of specially designed antifriction bearings into oil field equipment followed along after bearings of this type had established their value in mechanical equipment used in other industries. The essential difference between rolling friction and sliding friction was recognized long before the principles involved were fully exploited. Men in primitive times discovered that a log could be rolled easier than it could be dragged. The cart replaced the sledge. In recent decades ball bearings and roller bearings as used in bicycles and automobiles taught the public that a reduction of frictional resistance was possible because rolling friction is less than sliding friction.

Increasing demands made for efficiency in pumping and drilling equipment inevitably directed attention to the economic advantages of going to the greater expense involved in substituting specially designed ball bearings and roller bearings for bronze and babbitt bearings. In ball bearings and roller bearings the rolling friction is slight compared to the sliding friction of plain bearings—just as a heavily loaded barrel is easily rolled but it is dragged with effort even though the floor be smooth and slippery. Small as is rolling friction of ball and roller bearings still it is sufficient to make proper lubrication an important consideration. Lubrication facilitates the rolling motion and performs a useful function in the contacts between the balls or rollers and their cages.



In ball bearings the load is concentrated at a few points where the balls touch the race and in roller bearings the load is concentrated at a few lines of contact between the rollers and the surfaces of the journal and the bearing. Such points and lines have a distinct area, owing to the flexibility of all metals, and the resulting indentation of the small contact surface when pressure is applied. In the design of these bearings, consideration must be given that the load must not be great enough to cause indentation deeper than the elastic or fatigue limit of the material in the surface. The slight rolling resistance which does occur is not easily analyzed into all the factors involved in the total resistance.

The acceptance and wider use of antifriction bearings in oil field equipment has come in waves. Some equipment manufacturer ventures out to use an antifriction bearing at a point where it has not been used before, the advantages are recognized and other manufacturers follow.

After the first wave, previously mentioned (1919-1922) which was given an impetus in the drilling of Tonkawa, another wave got under way in 1927 and 1928 and then comes the period of accelerated increase in use which has been evident since 1930, during which time the field for antifriction bearings conspicuously extended to wider applications among which were their adoption in steam drilling engines and geared powers. Not only was this increase in use occurring in new equipment, but there has also grown up a practice of replacing babbitt bearings with antifriction bearings during the overhauling of used equipment such as countershafts, drawworks, etc.

The development of equipment to drill from depths which were considered beyond the limit of equipment in use 15 years ago, has been coincident with the more extensive use of ball and roller bearings in oil field equipment. The improved types of equipment have utilized the peculiar advantages of antifriction bearings. With the deeper drilling to horizons in certain localities, which the building of adequate equipment has rendered accessible, loads encountered in drilling have greatly increased and the saving of time in every operation has become more important. In deeper drilling more is at stake; each delay, though it may seem trifling at the time is a more expensive matter. And the functioning of the bearings is a vital concern. Not only must they assist in quick starting, but they must also be capable of standing up under the grind of continual operation and shock loads, whether the nature of the load be that of radial load, thrust load or combined load.

Bearings Used in Drilling and Pumping

Today the list of oil field equipment in which roller bearings and ball bearings are used includes:

- Rotary drilling
  - Crown block
    - Sheave bearings
  - Traveling block
    - Sheave bearings
  - Hook
    - Ball bearings or roller bearings to insure ease in swiveling
  - Swivel
    - Ball bearings and roller bearings to facilitate swiveling and to take the upward thrust of the swivel
  - Rotary
    - Table bearings
    - Hold down bearing
    - Pinion shaft bearings
    - Roller drive bushing
  - Drawworks, etc., roller bearings for
    - Drum
    - Drum shaft
    - Jack shaft
    - Line shaft
    - Transmission gear shafts
    - Engine shafts at outboard bearings
  - Slush pump
    - Main bearings
    - Crank pin bearings
    - Pinion shaft bearings
  - Roller bearing rock bits
  - Core drills with roller bearing cutters
- Internal combustion engines
  - Clutch pilot bearings
  - Outer bearings
- Steam engines
  - Crank shaft bearings
- Automatic cathead bearings

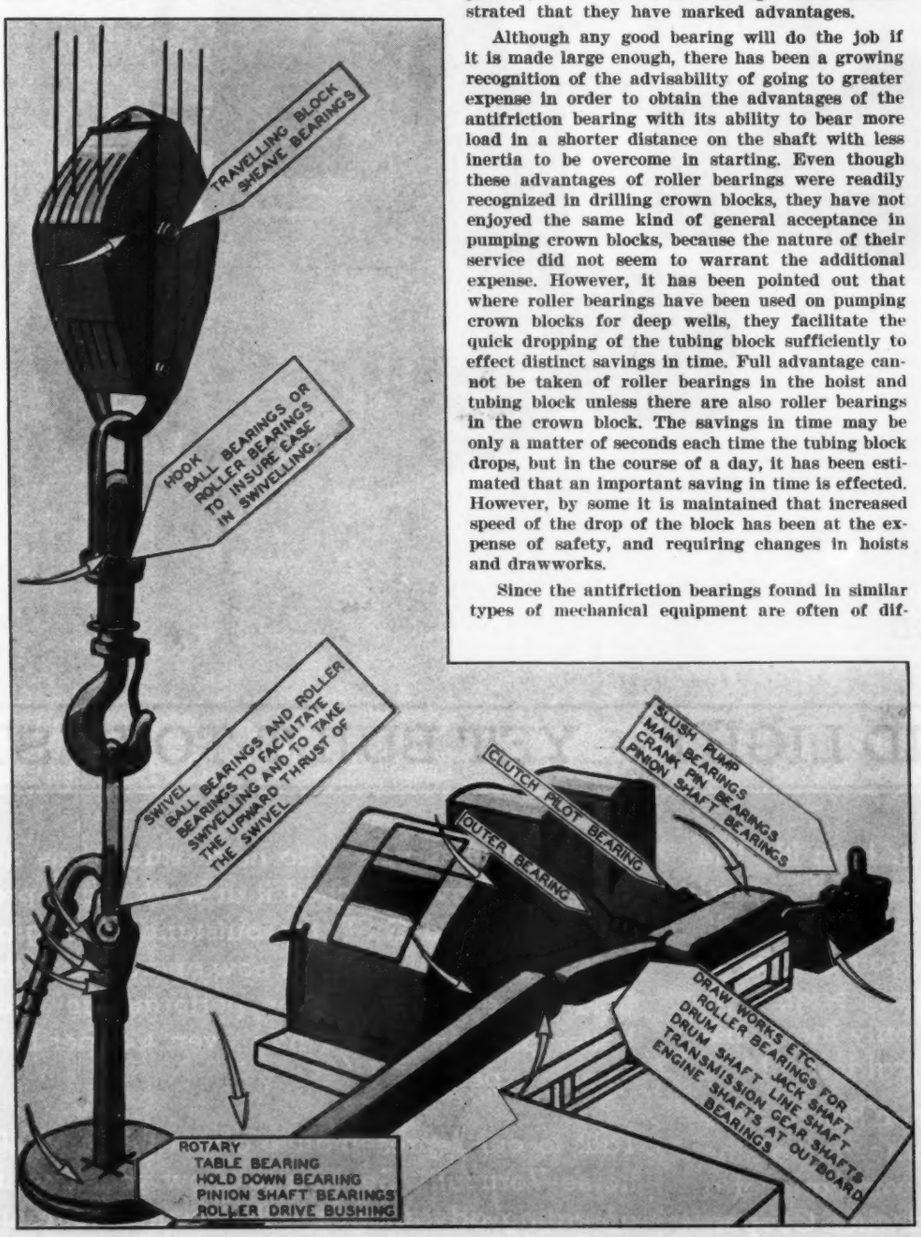
Hoists
Calf wheel, sand reel, bull wheel
Floor blocks
Countershafts
Electric generators
Power take-offs
Compressors
Gas and diesel engines
Pumping units.
Primary shaft bearings
Intermediate shaft bearings
Crank shaft bearings
Wrist pin bearings
Jack post bearings
Back crank equipment
Clutches
Winches
Spudders
Tubing blocks
Casing blocks
Centrifugal pumps

In the process of introducing roller bearings and ball bearings into the oil fields, considerable impetus has been given by equipment engineers in production departments, whose business it is to analyze mechanical details of equipment purchased by major oil companies in order to determine what will meet each requirement most effectively.

All bearings have this in common with bearings of the crudest and simplest types: Their purpose is to hold a shaft so that it will rotate on its axis and at the same time to prevent it from being pulled out of position by other forces acting on it. In comparing antifriction bearings with plain bearings of the three general classifications; that is, bearings without lubrication, bearings periodically lubricated, and bearings continuously lubricated, the bearing selected at each point where a bearing is used must be considered separately with due respect to the economic factors involved. In many cases the lubricated plain bearing functions in a way that compares favorably with antifriction bearings, provided the plain bearing has sufficient bearing surface. Certain types of antifriction bearings have an advantage where it is advisable to restrict the bearing surface. A comparison made between the performance of properly designed, lubricated plain bearings and antifriction bearings with regard to their load carrying ability, ability to stand shock and overload, and their cushioning capacity does not indicate the unique qualities of recognized types of antifriction bearings. However, a comparison of performance with special regard for relative frictional loss both at starting and while running. consumption of lubricants, consequences resulting from the stoppage of the supply of lubricant, and ease of replacement does reveal their qualities. A further consideration is that the plain bearings require running in time, while antifriction bearings need none. In these latter points of comparison, the antifriction bearings have demonstrated that they have marked advantages.

Although any good bearing will do the job if it is made large enough, there has been a growing recognition of the advisability of going to greater expense in order to obtain the advantages of the antifriction bearing with its ability to bear more load in a shorter distance on the shaft with less inertia to be overcome in starting. Even though these advantages of roller bearings were readily recognized in drilling crown blocks, they have not enjoyed the same kind of general acceptance in pumping crown blocks, because the nature of their service did not seem to warrant the additional expense. However, it has been pointed out that where roller bearings have been used on pumping crown blocks for deep wells, they facilitate the quick dropping of the tubing block sufficiently to effect distinct savings in time. Full advantage cannot be taken of roller bearings in the hoist and tubing block unless there are also roller bearings in the crown block. The savings in time may be only a matter of seconds each time the tubing block drops, but in the course of a day, it has been estimated that an important saving in time is effected. However, by some it is maintained that increased speed of the drop of the block has been at the expense of safety, and requiring changes in hoists and drawworks.

Since the antifriction bearings found in similar types of mechanical equipment are often of different make and design—there sometimes even being sound reasons for having one make of bearing at one end of a shaft and another at the other—the question is frequently raised as to just what determines the selection of a bearing for a specific kind of duty.


TRAVELLING BLOCK SHEAVE BEARINGS
HOOK BALL BEARINGS OR ROLLER BEARINGS TO INSURE EASE IN SWIVELLING.
SWIVEL BALL BEARINGS AND ROLLER BEARINGS TO FACILITATE SWIVELLING AND TO TAKE THE UPWARD THRUST OF THE SWIVEL
SLUSH PUMP MAIN BEARINGS CRANK PIN BEARINGS PINION SHAFT BEARINGS
CLUTCH PILOT BEARING
OUTER BEARING
DRAW WORKS ETC. ROLLER BEARINGS FOR DRUM SHAFT JACK SHAFT LINE SHAFT TRANSMISSION GEAR SHAFTS ENGINE SHAFTS AT OUTBOARD BEARINGS
ROTARY TABLE BEARING
HOLD DOWN BEARING
PINION SHAFT BEARINGS
ROLLER DRIVE BUSHING

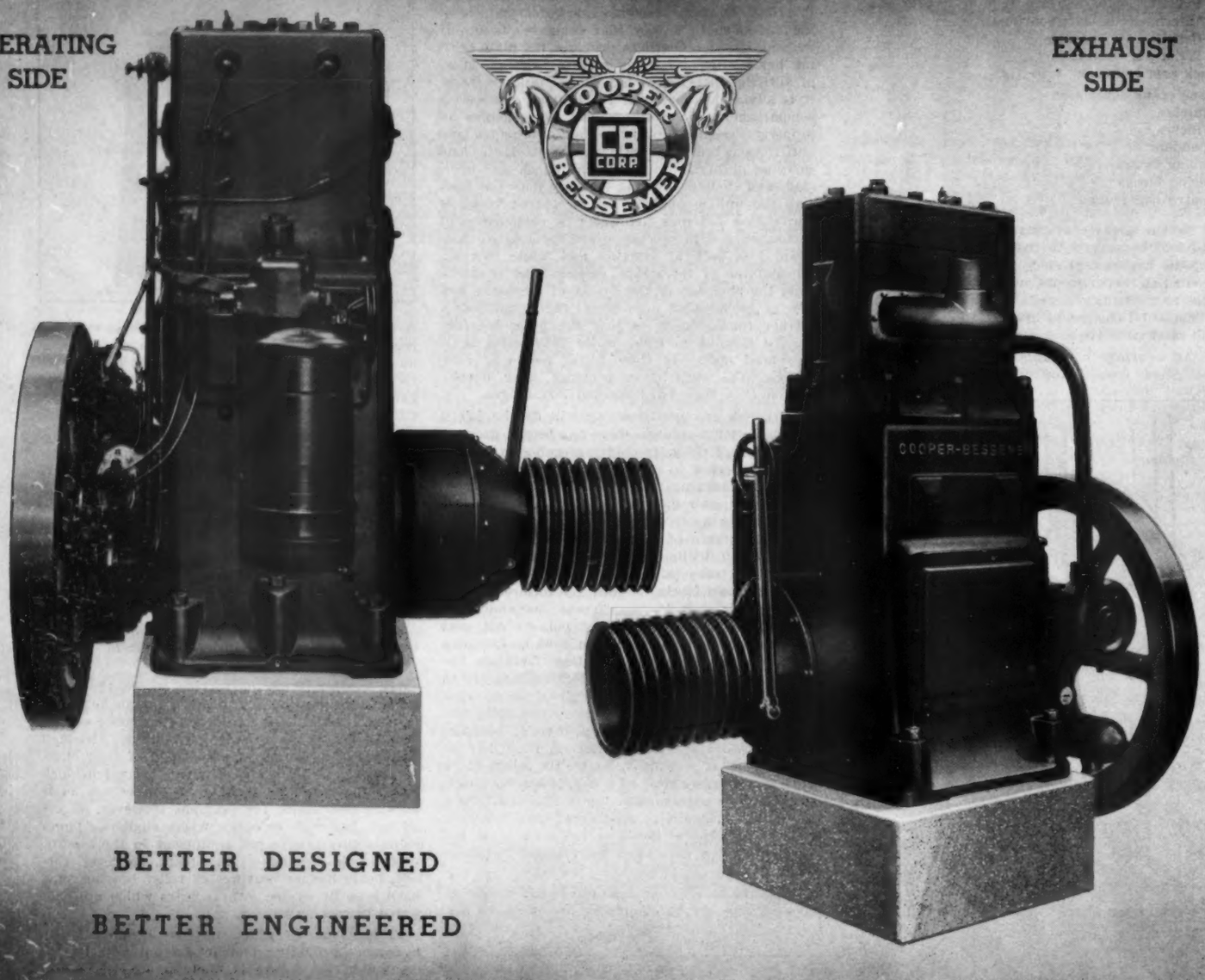
It appears that in the choice of a bearing, experience has indicated that actual service of a certain type of bearing under similar conditions is more important than strictly technical considerations. And the bearing manufacturers themselves make their recommendations largely on this basis. Owing to the number of variable factors, there is a limit to what can be calculated about the service a bearing will give. And the matter of determining the life of bearings by technical methods is believed to be an involved subject which leads nowhere, the most trustworthy criterion being that under similar conditions a certain bearing will serve in a similar way.

In certain types of service where the shaft takes a rocking motion and does not make a full turn, it has not been considered that roller or ball bearings could be used to advantage. Although some might assume that, on account of their characteristics, needle bearings might be used in such bearings where this rocking motion occurs as it does in crossheads, for example. However, as yet no case has come to notice where engine or pump manufacturers have put equipment in the market with needle bearings at this point. However, certain beam hanger bearings of roller bearing type have been in service several years which are subjected to rocking motion.

The extent to which the use of antifriction bearings in drilling and production will be increased in the future is likely to exceed prediction. In looking back over the last five or six years it can be seen that new mechanical developments have stimulated the use of ball and roller bearings. Such developments as the greater use of mechanical rotary rigs, portable hoists, and pumping units have increased the points at which antifriction bearings are regularly used. An increase in the price of crude is expected to favorably effect the economics involved in the use of bearings of these types.

The spreading use of ball and roller bearings in oil field operations whether induced by the necessity of eliminating excessive power consumption as in crown blocks, or whether to facilitate easier starting of gas engines where antifriction bearings make it possible to get along without an air compressor for starting, or whether to provide longer life for a jack post bearing particularly where pumping is done in sand storm country, or whether such bearings have been put on pinion shafts, eccentric rod cranks, and crank shafts to contribute to over all efficiency, the increasing use of these bearings has been continual and steady and in line with the oil industry's recognition of improvements in mechanical engineering which can contribute to drilling and production operations.

A Better 40 HORSE



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Every single detail of construction has had the benefit of all the talent to originate, and all the skill to produce, that is at the command of a century old engine builder. And when Cooper-Bessemer builds a pumping engine, Cooper-Bessemer builds it RIGHT!

Impartial observers who have studied its design, and have watched it at work, have pronounced Type G-SD the outstanding engine of its type. And the units now operating in the field have shown better performance — far better performance — than even Cooper-Bessemer expected.

Talk to our representative about this new 40-horse Vertical. Get him to show you how its operating advantages — the result of careful, experienced, unhurried engineering — WILL LOWER YOUR PUMPING COSTS.

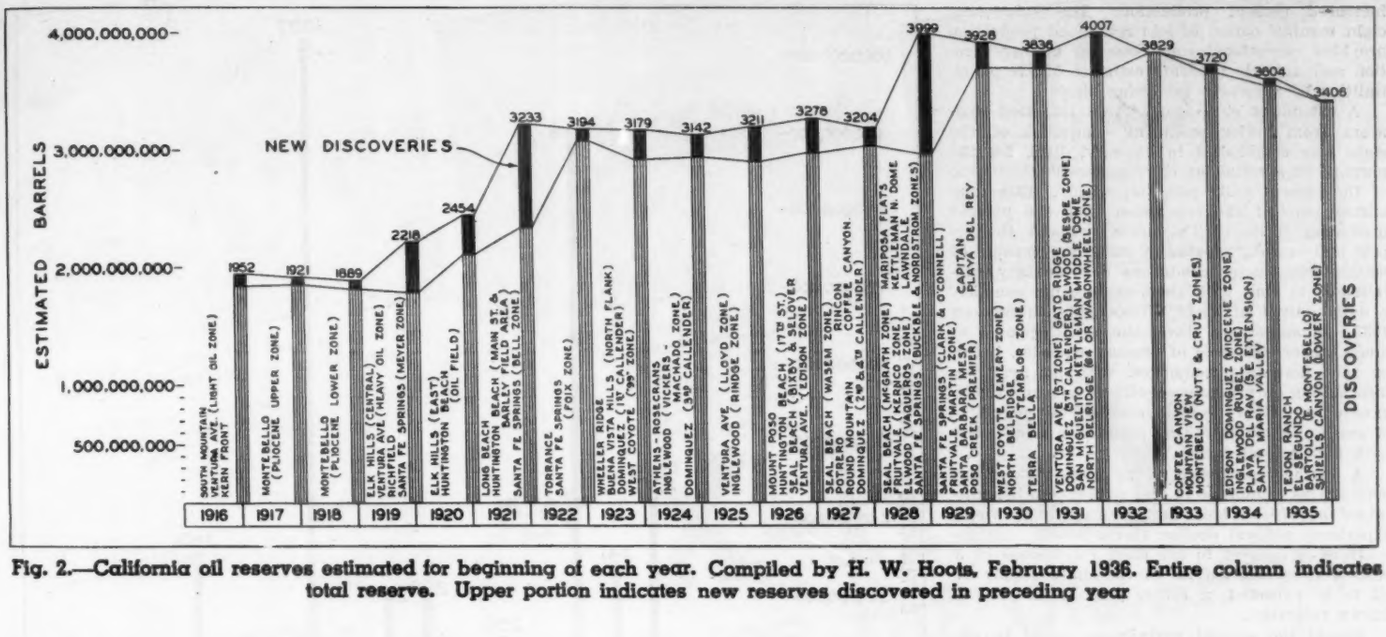


Fig. 2.—California oil reserves estimated for beginning of each year. Compiled by H. W. Hoots, February 1936. Entire column indicates total reserve. Upper portion indicates new reserves discovered in preceding year

Present Oil Supply in California

By HAROLD W. HOOTS

Geologist, Union Oil Company of California, Los Angeles, Calif.

Discoveries of new supplies of oil in California during 1935 have been insignificant when the total of this new supply is compared with yearly demand or with estimated decrease, during this same period, in the ability of other existing fields to yield oil. Since the magnitude of total annual discoveries has declined with slight interruption from over 1,000,000,000 bbls. in 1928 to about 10,000,000 bbls. in 1935, it is important to appraise the effect of this decline upon California's supply of oil and of interest to speculate as to the future.

A committee of the American Petroleum Institute composed of past presidents of the American Association of Petroleum Geologists recently prepared estimates of oil reserves for the United States and for each major producing state[1]. California was estimated by this committee to have a known reserve of 3,500,000,000 bbls. of oil recoverable by ordinary current methods of production under prices prevalent on January 1, 1935. This amount represents 28.74 per cent of the total estimated reserves for the United States and, offhand, might be considered sufficient for a number of years. The most important feature of the oil reserve situation in California, however, is not the size of the total known reserves but rather the length of time during which these reserves will yield an adequate daily supply.

The average California oil field as compared to other producing fields of the United States is characterized by long life, moderate decline during the initial period of flush production, and many years of slowly declining and settled production while on the pump. At present about 60 per cent of the state's total production comes from pumping wells while 85 per cent of the remainder, although flowing, is coming from fields or zones discovered from four to ten years ago and now on the decline. Discoveries made in the last four years are of minor importance as to both present daily yield and maximum daily potential if fully developed. The period of flush production is past for all fields except Kettleman North Dome (1928)[2], Kettleman Middle Dome (1931), North Belridge deep zones (1930 and 1931), Mount Poso (1926), Round Mountain (1927), parts of Mountain View (1933), Ventura Avenue deep zones (1925-1931), Inglewood deep zones (1925 and 1934), Dominguez (1923-1934), and West Coyote deep zones (1923-1930), and it appears that the flush production from all of these except Kettleman North Dome, North Belridge, Ventura Avenue, Inglewood, Dominguez and West Coyote will be near an end by 1940.

The more or less regular discovery of new fields or new zones with large initial daily capacity is necessary to maintain daily supply on a level with uniform demand. Although present daily potential supply is considerably in excess of current demand, new discoveries in 1935, if completely developed, probably would not produce more than 10,000 bbls. daily, and the total discoveries for the last four years, if similarly developed, probably would not yield 80,000 bbls. daily for one year.

Rate of Past Discovery

The accompany chart (Figure 1) shows by years the estimated magnitude of oil discoveries in California since 1915. Peaks in the rate of discovery occur in 1921, when Long Beach, Huntington Beach, and the Bell Zone of Santa Fe Springs were found, and in 1928 when Elwood, deeper zones at Santa Fe Springs, and Kettleman North Dome became established producers. The rate of discovery has been erratic but from 1919 to 1928 inclusive there did not elapse two consecutive years in which combined discoveries did not exceed demand. This scarcity of lean years together with the excessive new reserves of 1919, 1920, 1921, 1928, and 1931 permitted the development of a sizable backlog for future needs. It is apparent from the chart that this reserve supply has been rapidly depleted during the last four years, for during this period an estimated total of only 135,000,000 bbls. of new oil has been found—an amount sufficient for eight months' requirements if, by magic, it could be produced in that short time.

The effect of the past discovery rate on known reserves appears in Figure 2. In this chart estimated reserves are shown for the first of each year as calculated back from all present available information on past production and estimated future. The upper part of each column indicates the estimated amount of oil discovered in the immediately preceding year. It is clear that there has been a steady decline in total estimated reserves since January 1, 1932, and except for 1932, a steady decline since January 1, 1929. It is equally evident that the major additions to estimated reserves occurred in 1921 and 1928 and that for uniform periodic recurrence of similarly large additions 1932 should have been a good year.

_A.A.P.G._—Review of the developments in California during 1935 is given in this paper presented before Annual Meeting, American Association of Petroleum Geologists, Tulsa.

Present and Estimated Future Daily Supply from Known Reserves

Production of oil in California, as elsewhere in the United States, has been curtailed since 1929. The amount of present actual curtailment is debatable but it is certain that it is much less than the official percentages used as the basis for allocating production from 1930 to May, 1935. Almost immediately after invalidation of the National Recovery Act and its accompanying National Petroleum Code in May, 1935, production was increased in flush fields and curtailment was practically abandoned in all fields except those restrained by enforced gas conservation or controlled by major companies who considered the future life of these fields of more value than

[1] "Petroleum Production and Supply," Bull. Amer. Assoc. Petrol. Geol., Vol. 20, No. 1, January, 1936, pp. 1-14.

[2] Year of discovery.

increased present production. The subsequent eight months' period of less restrained production provided exceptional conditions for an investigation and a fairly accurate estimate of the potentialities of currently producing fields.

A committee composed of well informed engineers from major producing companies of the state was established in January, 1936, for the purpose of arriving at the best possible estimate of the present daily potential supply. This committee reached the conclusion that the present producing fields of California, without the repair and opening of shut-in wells, are capable of maintaining, under conditions of voluntary curtailment in line with good engineering practice, a daily output of about 670,000 bbls. throughout 1936. In defense of this estimate as opposed to much higher estimates of present potential, it can be said that this committee, with all available information on pressure conditions in many fields, gave extraordinary consideration to the necessity of closing in or restricting production from wells with high gas-oil ratios.

A further conclusion of at least some members of this committee is that production, if maintained at 670,000 bbls. daily during 1936, would experience natural decline thereafter.

It is of interest to use these conclusions as a basis for speculation as to the daily supply of oil to be expected in future years from present known reserves.

Should the present curtailment effort be entirely successful, the state's output will be curtailed to near 537,000 bbls. a day during the remainder of 1936—a figure agreed upon by authorities to be in line with the current rate of consumption. Such curtailment would hold in reserve for most of 1937 a daily supply of about 130,000 bbls.

Without curtailment for the remainder of 1936, and without rehabilitation of producing and shut-in wells, it might be expected that California production would decline about 20 per cent during 1937—or from 670,000 bbls. to 535,000 bbls daily by the end of the year—providing an average of about 600,000 bbls. daily for 1937.

With curtailment of 130,000 bbls. a day during the remainder of 1936 and with continued curtailment of any excessive production during 1937, the ability to produce an average of 600,000 bbls. daily—or at least an amount equal to expected demand—should be extended to the end of 1938.

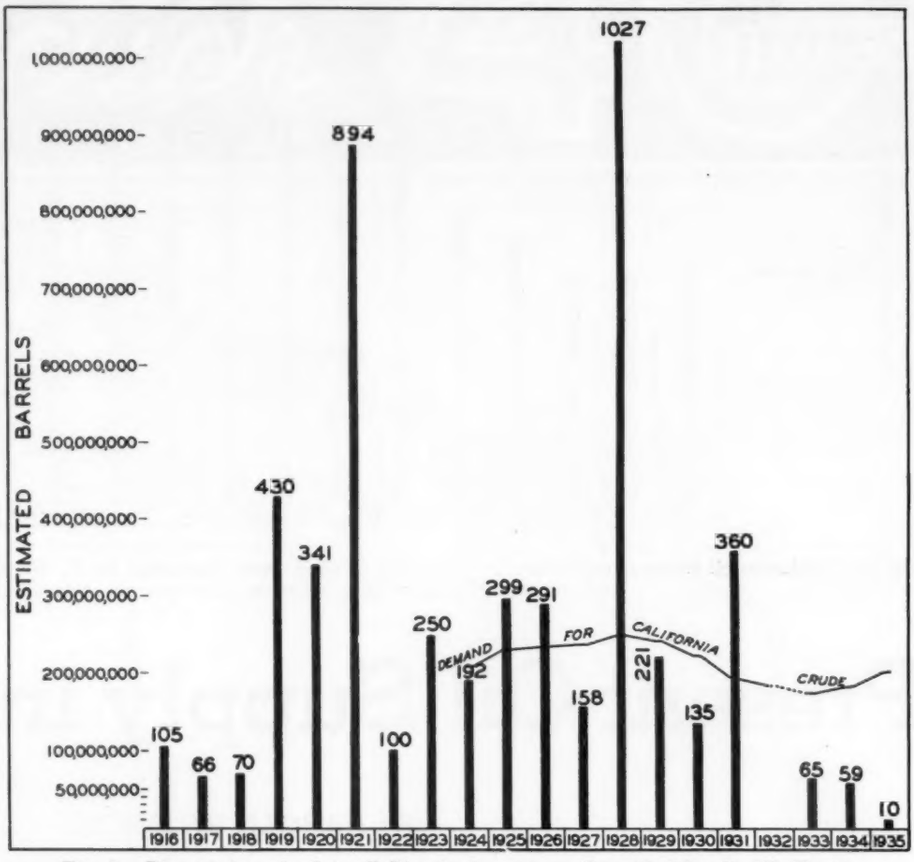
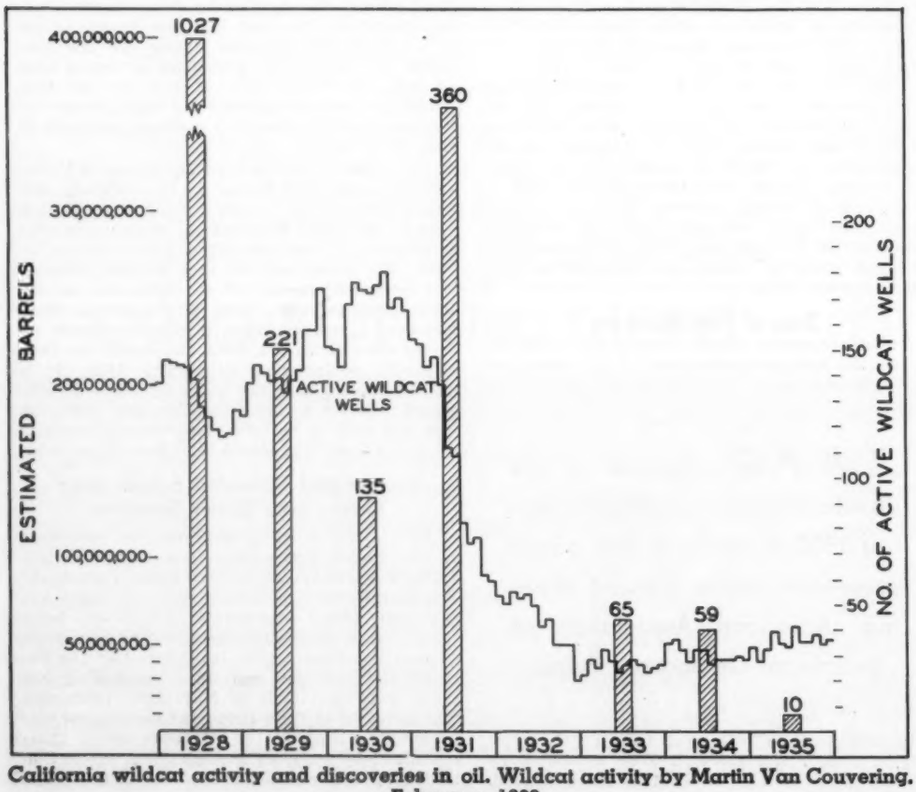


Fig. 1.—Discoveries of oil in California by years. Compiled by H. W. Hoots

To insure this it is considered that continuation of present development programs in proven areas will be necessary.

Unless important additional reserves in the form of new fields or deeper zones be discovered, it does not appear unreasonable to expect that California must begin in about 1939 to depend in considerable degree upon the rehabilitation of old wells, both producing and shut-in, to provide a daily supply of crude comparable to that deemed necessary at present.

The reconditioning of old wells is in progress now and the reopening of shut-in wells as early as 1931 is apparent from examination of Figure 3, prepared from data compiled by W. R. Wardner, Jr., statistician with the state oil umpire. Currently shut-in wells are estimated to be capable of yielding 117,313 bbls. daily and, when threatened shortage and crude prices justify, these and new wells in proved but undeveloped areas might be made to produce 150,000 bbls. Assuming that no important new discoveries be made, all oil resources of the state should be needed in about 1940 to maintain an annual supply equal to present demand. Subsequent decline, assuming that no major improvement be made in present pumping methods, might be expected to carry the state's average daily production to 500,000 bbls. in 1941, 400,000 bbls. in 1943, and 300,000 bbls. in 1947.



California wildcat activity and discoveries in oil. Wildcat activity by Martin Van Couvering. February, 1936

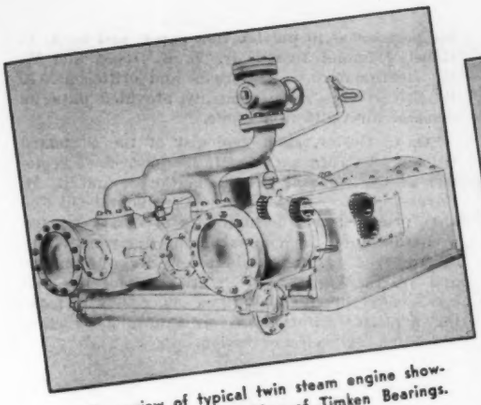
Reasonable Expectancy from Deeper Zones

Several fields in California are considered to have good possibilities for the discovery of deeper zones. Although there is little basis for an estimate, it would be reasonably optimistic to assume that all of these possible deeper zones will yield a total of 500,000,000 bbls. and that they will be discovered and be produced at a rate which will delay a shortage of oil for an additional three or four years and permit California to produce its present daily demand for 550,000 bbls. until 1943-1945.

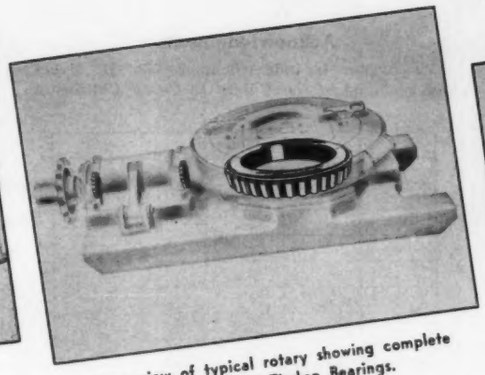
The above estimate of the amount of oil to be discovered in deeper zones may not even be approximate—it may be 50 per cent too large or 100 per cent too small—but the conclusion to be drawn can be revised only as to time unless large reserves in new fields be discovered.

Trends in Exploration Activity

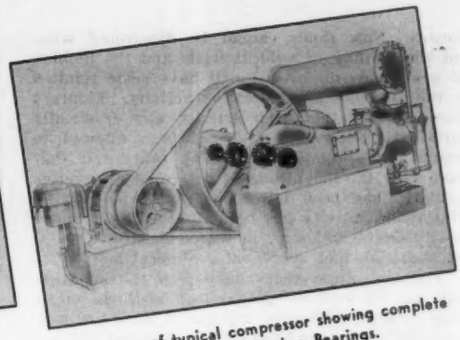
The rate of discovery of new fields (excluding deeper zones in old fields) has declined rapidly since 1928. The cause of this decline is multiple but in major degree at least is one of eco-



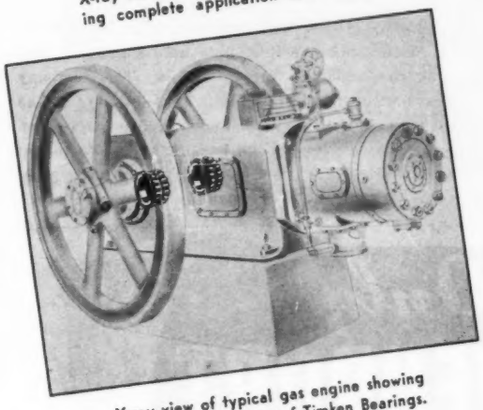
X-ray view of typical twin steam engine showing complete application of Timken Bearings.



X-ray view of typical rotary showing complete application of Timken Bearings.



X-ray view of typical compressor showing complete application of Timken Bearings.



X-ray view of typical gas engine showing complete application of Timken Bearings.

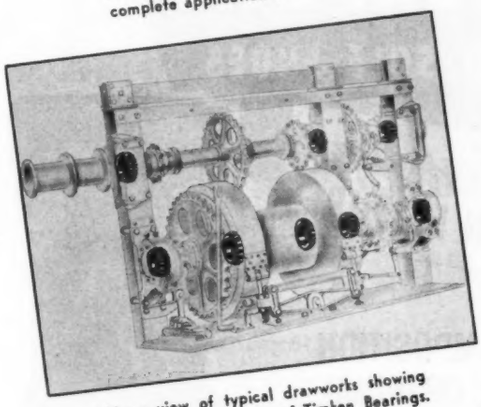
AN X-RAY VIEW OF THE OIL SHOW

If you had X-ray eyes so that you could look right into the many different kinds and makes of heavy duty oil field equipment at the oil show, you would find one striking similarity in an overwhelming majority of them—a preponderance of Timken Bearings.

There are more Timken Bearings than ever at this year's show, for as operating speeds and capacities have increased in response to growing production requirements, the need for Timkens' frictionless performance, radial-thrust load capacity and ability to hold moving parts in correct and constant alignment has become more and more urgent.

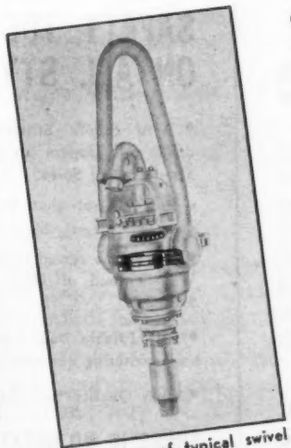
The dominance of Timken Bearings in all kinds of heavy duty machinery throughout the oil fields is not the result of fortunate circumstance. It has been won—and is being maintained—by downright superiority . . . because there is no substitute for the exclusive combination of Timken tapered construction, Timken positively aligned rolls and Timken Alloy Steel.

Your most important question when buying rig fronts, rotaries, drawworks, swivels, engines, pumps, compressors or any other kind of oil field equipment—"Is It Timken Bearing Equipped?"



X-ray view of typical drawworks showing complete application of Timken Bearings.

X-ray view of typical geared pumping power showing complete application of Timken Bearings.



X-ray view of typical swivel showing complete application of Timken Bearings.

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nomics. New fields cannot be discovered without the drilling of wildcat wells and the number of new fields discovered will have some relation to the intensity of wildcatting activity. Figure 4 shows clearly that such activity was drastically curtailed during 1931 and has been allowed to remain at a comparatively low rate; and that since 1931 the magnitude of new field discoveries similarly has been low. Renewed expansion of wildcatting activity has been retarded by reduced profits in the industry, increased hazard of wildcat ventures, and decreased geological activity.

The last three years have seen the adoption and use of various geophysical methods on a large scale in California. By use of these methods anticlinal structures have been located and mapped but resulting exploration by drilling has been disappointing in that no oil fields and only a few gas fields have been found.

Future success in the discovery of new oil fields of major proportions in this state depends upon the intensity and character of geological activity. Hidden fields unquestionably exist but their discovery may require more thorough investigation of fundamental geological problems and a considerable realignment of geologic activity. This geological activity must necessarily include intelligent use of geophysics, micropaleontology, and any additional geological tools that may be devised.

Acknowledgments

The writer is indebted to Desaix B. Myers, chief geologist of the Union Oil Co. of California, for permission to publish this paper, and to A. C. Rubel, Edmund Jussen, Jr., E. B. Noble, and W. W. Heathman for suggestions and criticisms. E. R. Erb of this same company provided data on demand for California crude.

G. C. Gester, chief geologist of the Standard Oil Co. of California; C. M. Wagner, chief geologist of the General Petroleum Corp.; and R. M. Barnes, chief geologist of the Continental Oil Co., have provided considerable data necessary for the preparation of the charts on oil discoveries and oil reserves. J. R. Pemberton, state oil umpire, and W. R. Wardner, Jr., statistician of the umpire's office, have collaborated generously in making available information on shut-in production and pumping well production.

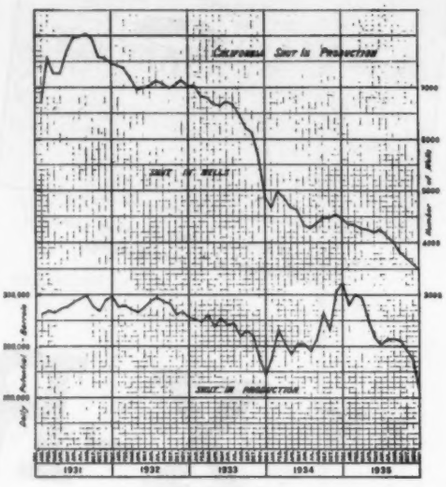

Figure 3

Saskatoon Gas Project

SASKATOON, Saskatchewan, May 16.—The C. H. Withers Co. of Regina is applying for a natural gas franchise for Saskatoon. The company has contracted for the output of Colony Oil & Gas Co. wells in the Lloydminster field. The two Colony wells, which are shut in, had an aggregate initial open flow of 51,000,000 feet a day, with rock pressures of 410 and 439.5 pounds respectively.

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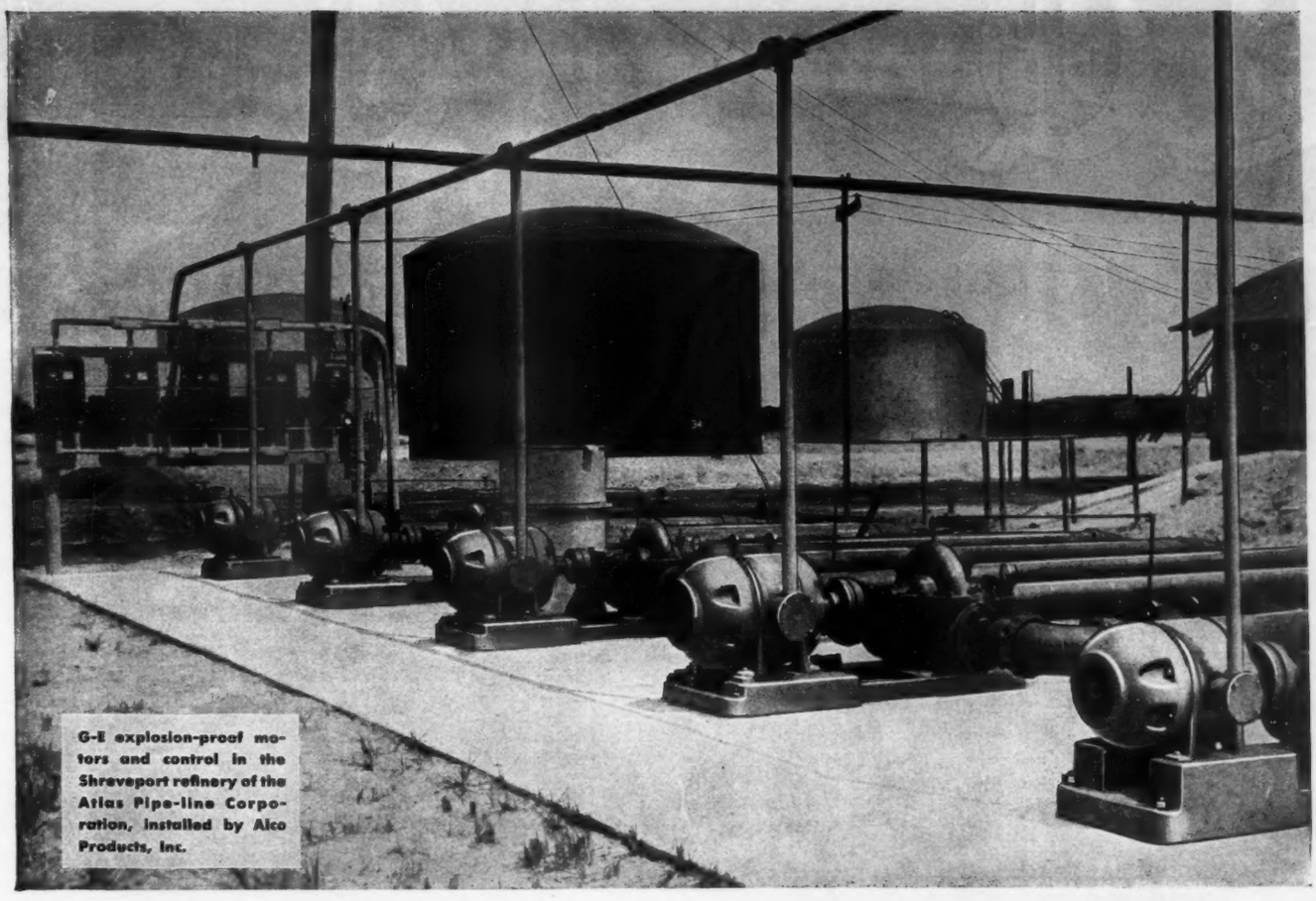

G-E explosion-proof motors and control in the Shreveport refinery of the Atlas Pipe-line Corporation, installed by Alco Products, Inc.

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Special enclosures do not have to be built over G-E explosion-proof motors and control. These equipments are truly weatherproof, as shown by the installation pictured above.

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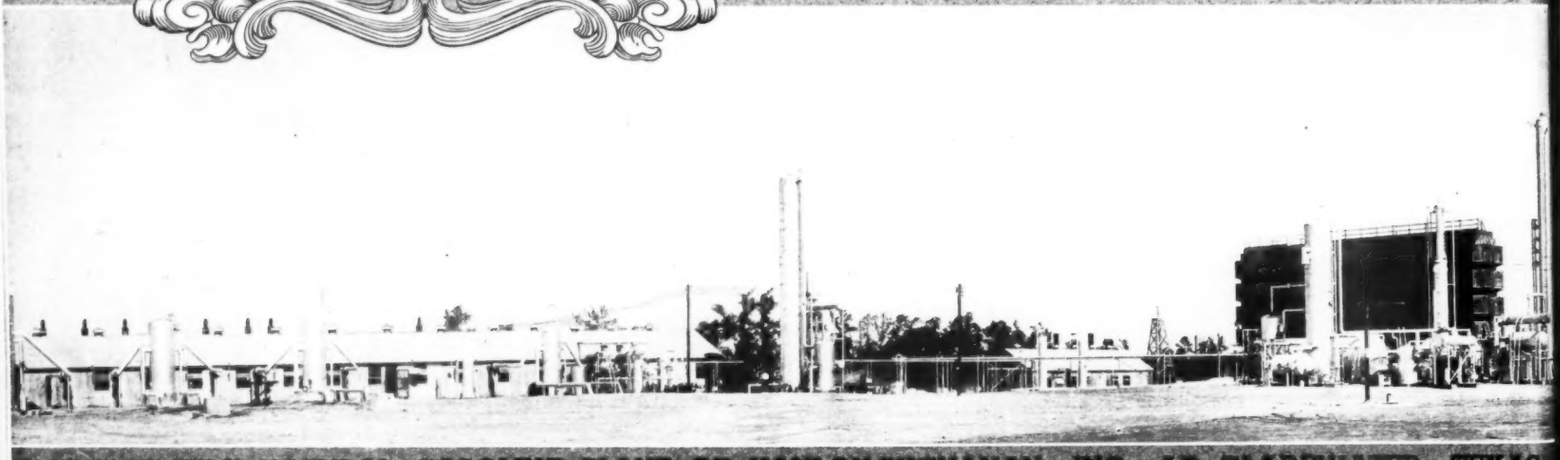

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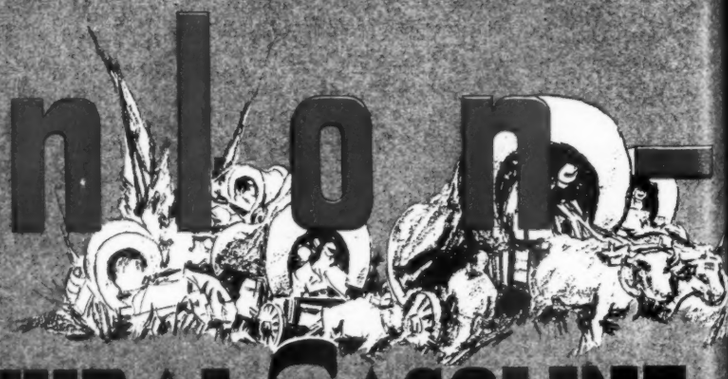

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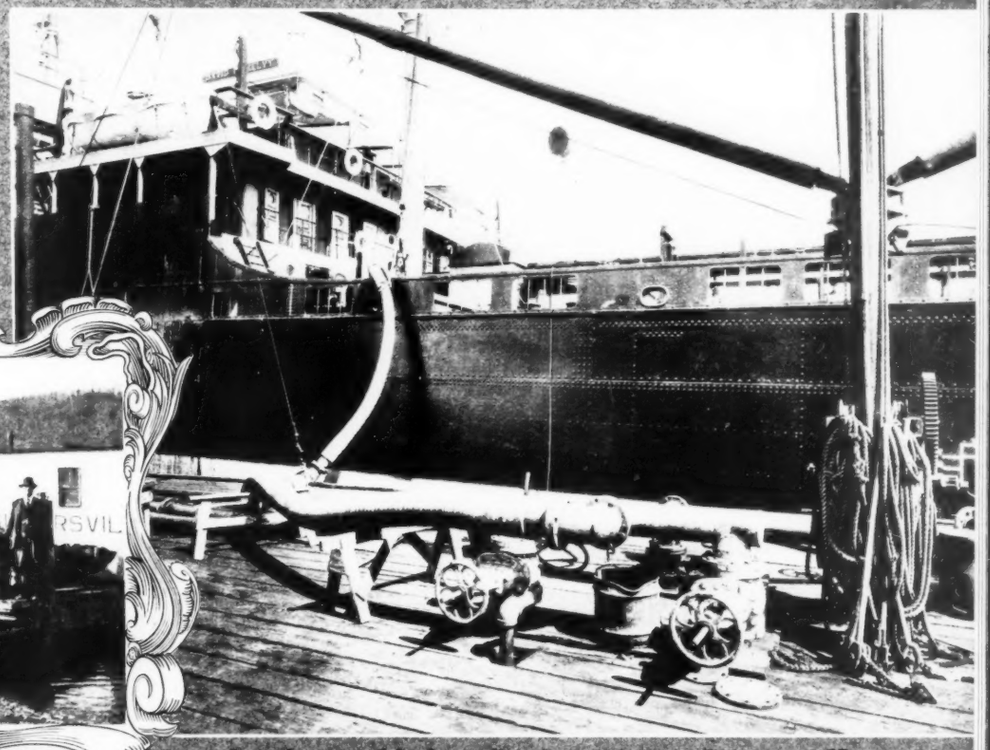

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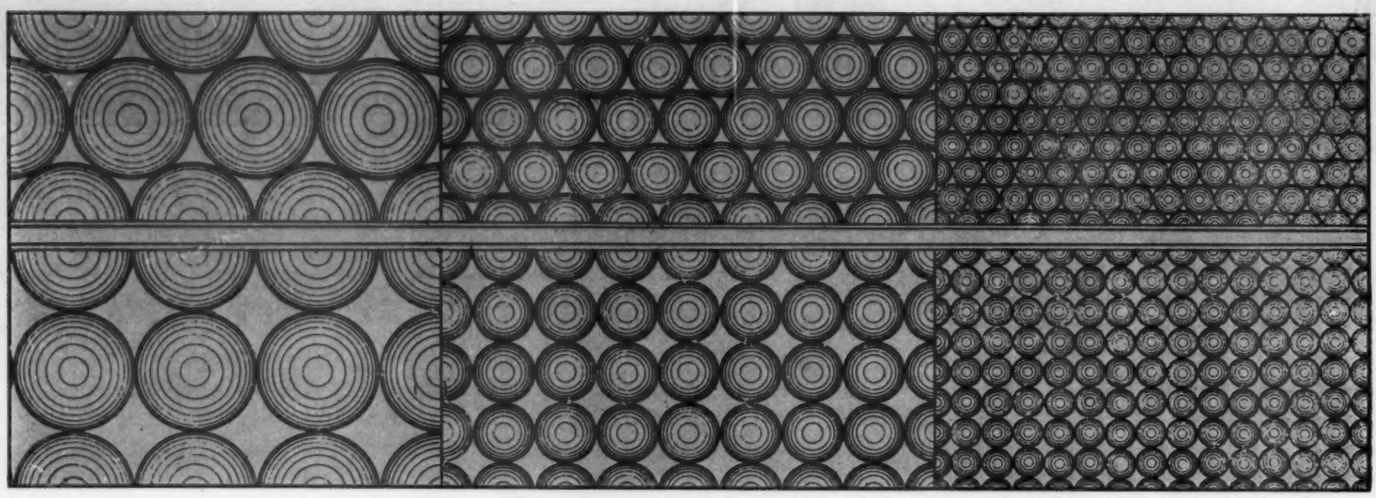

Diagram No. 1 — Maximum and minimum pore space of spherical soil grains

CIRCULATION LOSSES

By ROY A. SILENT
Petroleum Securities Co., Los Angeles, Calif.

The loss of circulation has been a problem in drilling oil wells since their inception, but generally speaking, the losses of circulation during drilling by the rotary method have been more important to the industry than those occurring while drilling with cable tools. As an example, it may be pointed out that the loss and contamination of the mud fluid have been represented by mud bills as high as $100,000.00 for a single well, but recent developments in mud controlled procedure have largely reduced these figures.

The loss of circulation may be divided into two classes—loss into fissures, channels, etc., formed in the formation, and secondly losses into the formation proper. The first phenomena calls for an empirical treatment and the within paper is limited to discussion of the second phase of lost circulation. The present practice indicates that losses of circulation can best be avoided by control and modification of the qualities and properties of the mud laden fluid used in drilling. The proper conditioning of the mud will not only prevent the loss of water to the formations through which the well is drilled, but in some cases prevent the loss of the entire constituency of the drilling fluid itself. Further, such conditioning will prevent the loss of water to the formations through which the well is drilled, but in some cases prevent the loss of the entire constituency of the drilling fluid itself. Further, such conditioning will prevent the penetration of water and fluid into producing formations which in turn will prevent damage to the productivity of the zones so penetrated. It is certain that in the past numerous producing zones have been passed up as unproductive, when, as a matter of fact, they have been sealed off through lack of knowledge of proper mud fluid control.

In considering the medium into which the drilling fluid passes when the formation is lost, study must be given to the structural characteristics of the formation and to the total void spaces around the individual grains, and the extent and subdivision, size and form of pores between the grains. It may be seen that void spaces vary between 26 and 48 per cent, depending upon the way that the grains are compacted in the formation; and that the relative area of the pore space for spherical grains is not altered by their diameter as long as all have the same form and are packed alike. However, the diameter of the pores through which the fluids may move are largely affected by the grain size. As a general rule, the porosity of sands vary between 33 and 39 per cent void. With the decrease of size of the grain particles, the individual pore channels approach capillary dimensions with correspondingly high friction resistance to passage of fluid. Such pores can be effectively blocked by the introduction of inert material which is finely enough divided to enter such pores. The addition of colloidal material to the drilling fluid provides an ideal material for pore blocking, which in turn prevents losses of circulation and prevents penetration of the fluid into the formation. Once water or other fluid enters a formation, it is extremely difficult to dislodge, due to the tension of the surface film surrounding each sand particle.

A.P.I. Circulation losses and their relation to composition of the structures are discussed in this paper presented before the Pacific Coast District Meeting, Los Angeles, Calif.

The distance of penetration of colloidal material (usually Bentonite) into the formation is negligible. Examination of numerous samples which have been submitted to pressures as high as 2,500 pounds per square inch through long periods of time, indicate a penetration of the colloidal material not exceeding two and one-half times the grain size of the formation. Further, such deposits of colloidal in the surface grains can be readily removed by reversal of the pressure and does not form a permanent obstruction.

The same practice can be applied to formations composed of very coarse material, providing a fibrous material is added to the mud fluid which acts as a binder for the colloidal material. Here, again, the penetration of the blocking medium rarely exceeds two and one-half times the grain diameter, even for materials composed of grains as coarse as one-half inch in diameter. Cakes thus formed are not as readily dislodgeable as those composed of pure colloid. There are several patented or undisclosed formulas which act by depositing a precipitate in the formation, which precipitate acts as a more or less effective seal. In some cases this precipitate may be redissolved by the action of suitable chemicals.

A practical illustration of colloidal sealing is given by reference to the behavior of certain wells in the middle dome area of the Kettleman Hills field in California. In this case the colloidal material obtained from drilling was sufficient to form an effective seal against relatively high pressures from within the well, but would not hold back pressures from without.

From the foregoing the conclusion is drawn that wells which lose fluid into ordinary formations can be controlled by mud conditioning, and losses of fluid into the formations prevented, with the resulting protection of the formations themselves.

Problems arising from the loss of fluid from the holes of drilling oil wells are practically as old as the art of drilling itself. Such losses were troublesome during the era of cable tool work, in that they necessitated replacement of the drilling fluid, usually water mixed with the cuttings incidental to drilling. Sometimes such losses resulted in stuck tools, but it was not until the advent of rotary drilling as a general practice that fluid losses and the consequences caused thereby became serious enough to require special consideration.

We have only to consider the expense arising from the loss of circulation in rotary drilling due to stuck tools and twist offs, etc., as well as the cost of the mud fluid itself, to realize what a factor this phenomena represents in the industry. As an example, it may be pointed out that in certain areas in California the loss and contamination of the mud fluid are represented by mud bills of as much as $100,000.00 for a single well. Fortunately recent developments in mud control procedure have largely reduced these figures.

Two Classes of Losses

Loss of circulation may be divided into two classes: First, the loss into fissures, channels and so-called caverns formed in the formations; secondly, losses into the formations proper. The

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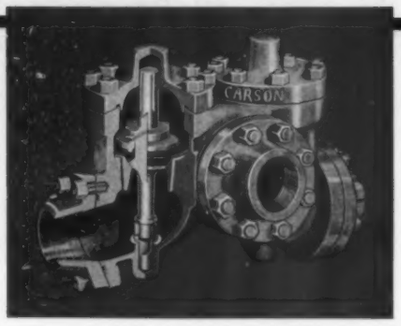

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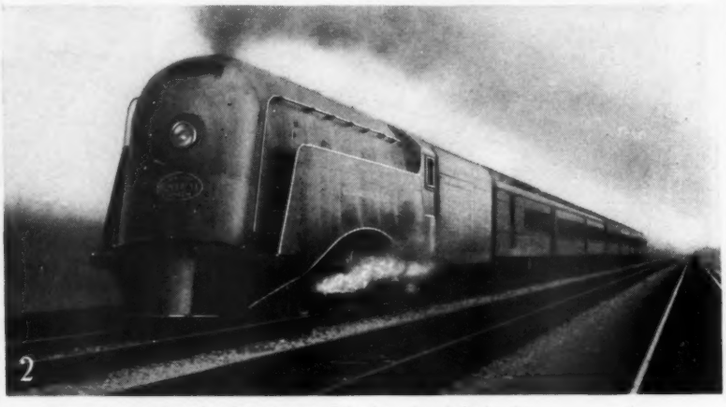
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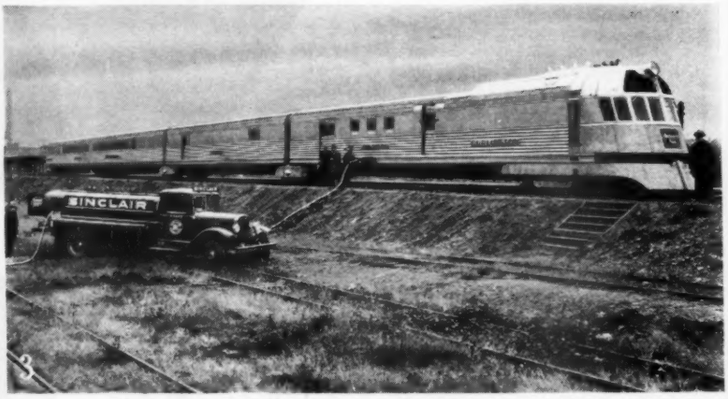

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first phenomena is generally found in closely drilled fields where there is interference or interconnection between wells. It is not uncommon for channeling to occur between wells drilling and wells pumping. In many cases where quantities of materials such as cottonseed hulls, etc., have been used in attempts to recover circulation in the drilling well, such materials have subsequently

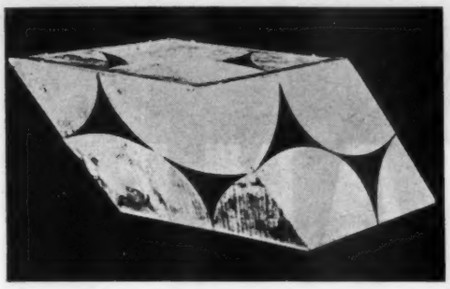

Fig. 1—Unit rhombohedron formed by passing planes through the centers of eight contiguous spheres in the most compact packing of a mass of spheres

been pumped to the surface with the fluid of the adjacent producing wells.

In wells where circulation is lost in fissures or channels, the following named variety of materials are often used as plugging mediums in attempting its recovery—cottonseed hulls, bales of cotton, beet pulp, rope yarn, manure, sacks of beans and peas, rice, asphalt and cements. These materials in quantities measured sometimes in tons have been intoduced into wells with varying success. In numerous cases immense quantities of such materials have been used and have completely disappeared never to be heard of again. Such problems are unusual and purely empirical of solution and it is the second phase of loss of circulation that this paper will treat. This latter problem has to deal with the causes and remedies of losses of circulation through the normal interstices, great or small, in the formations through which the well is drilled.

Importance of Mud Control

Present practice indicates that such losses can best be avoided by control and modification of the properties and qualities of the mud laden fluid used in drilling. Jones and Babson in their admirable paper on the subject of mud[1] say: "One of the most important functions of drilling mud is to deposit a mud cake onto the walls of the hole which will prevent the loss of water to the formations through which the well is drilled." This statement may be extended to read that proper control of the mud will not only prevent the loss of water to the formation, but in some cases the loss of the entire constituency of the drilling fluid itself, and what is infinitely more important, it will prevent the penetration of water and fluid into the producing formations. Such penetration generally results in a material reduction of the initial and ultimate productivity of such zones.

It is certain that in the past the lack of mud control has ruined the productivity of many wells, and that numerous producing zones have been passed up as unproductive, when, as a matter of fact, they have been sealed off through lack of knowledge of the qualities of the mud laden fluid required to prevent just such action from occurring.

Structural Characteristics of Formation

In giving consideration to losses of circulation, it is desirable to know something of the medium into which the drilling fluid passes in cases where the formation absorbing the fluid is other than a crevice or fissure. In other words, usually, more or less porous sands. The subject of sand porosity and effect of its grain size has been exhaustively treated by Franklin Hiram King and Prof. Charles E. Slichter[2] and certain of their conclusions are interesting in connection with the consideration of lost circulation problems.

From the findings of the above mentioned au-

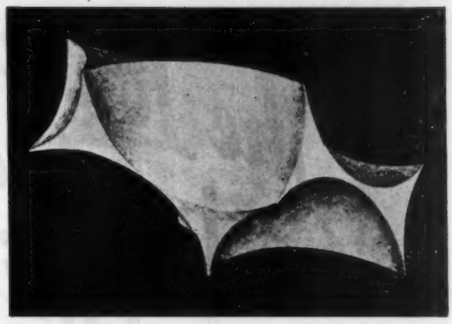

Fig. 2—Unit element of the pore space in a mass of spheres packed in the most compact manner possible. A plaster cast of the interior of the rhombohedron of Figure 1. The spheres were not quite in contact, surfaces being separated about one-half centimeter

thorities and from the writer's own observation, it is certain that both the diameter of the sand grains and the amount of pore space resulting from the massing of the grains together, are factors of importance in determining the amount of fluid which may pass through or into a given section of any stratum in a unit of time. Consideration must be given not only to the total void space,

[1] "Evaluation of Drilling Mud" by P. H. Jones and E. C. Babson, presented at the Sixteenth Annual Meeting of A.P.I., Los Angeles, Calif., November 13, 1935.

[2] "Motion of Ground Waters," Franklin Hiram King and Charles S. Slichter, Part II of Nineteenth Annual Report of United States Geological Survey.

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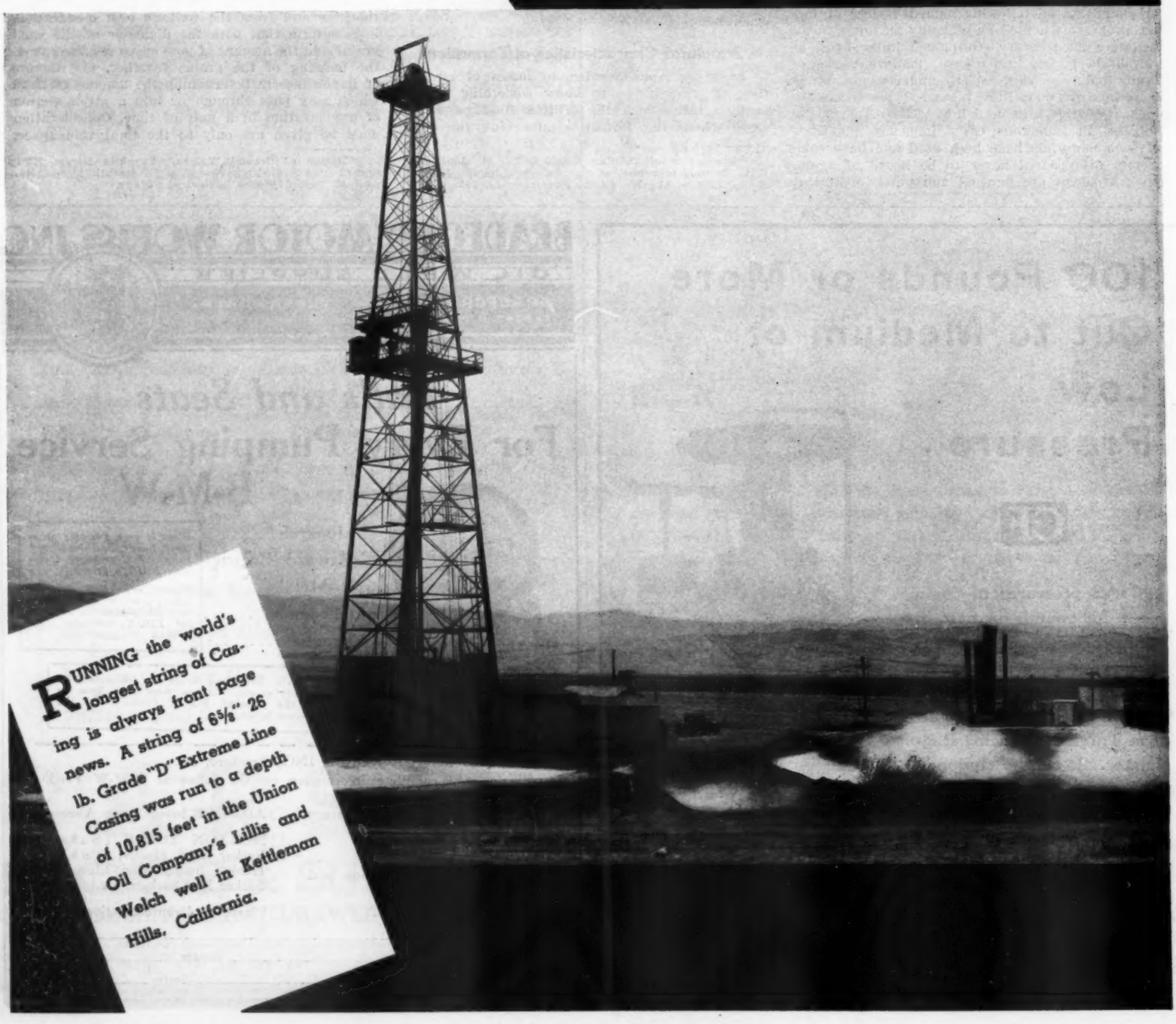

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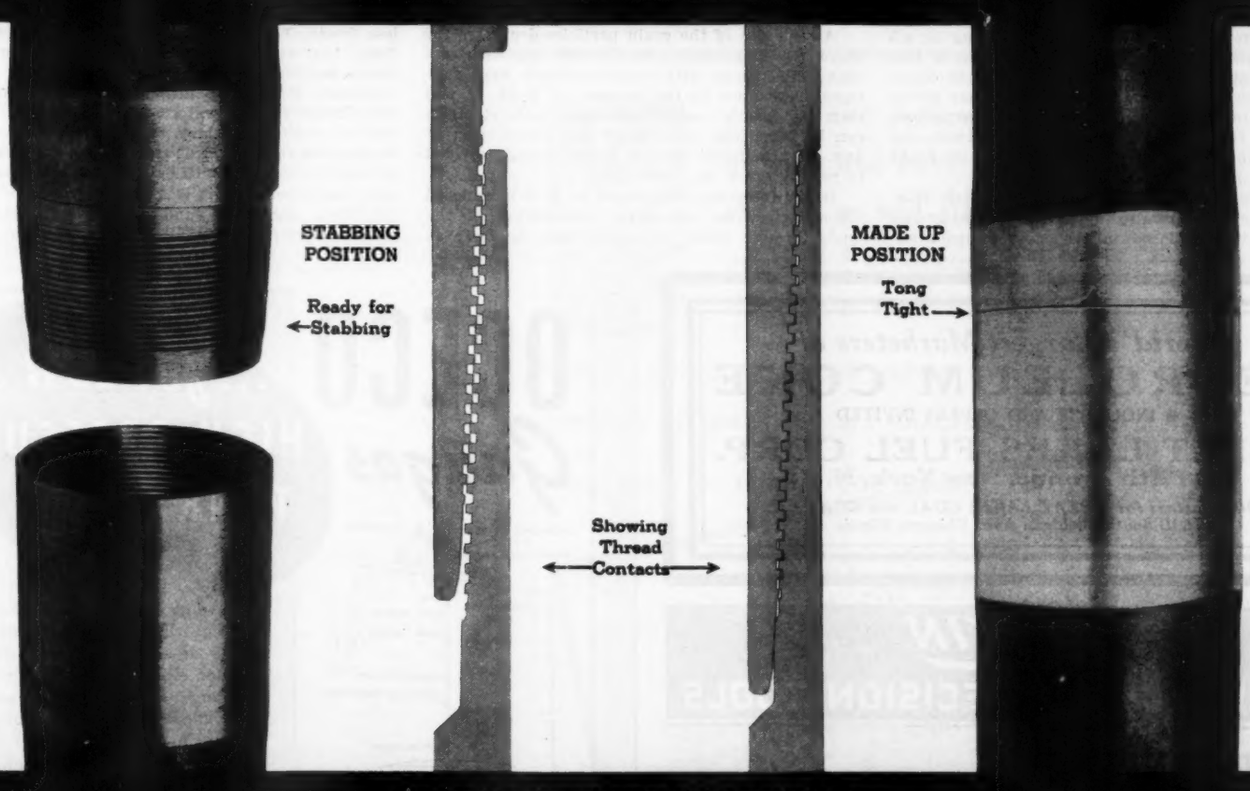

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but to the extent of subdivision and form of the pores between the grains as well.

A mathematical consideration of the relations of the spherical sand grains of uniform diameter to the pore space may be established. The values of the percentage of the pore space for such conditions varies between 26 and 48 per cent. These facts may be seen by an examination of Diagram I. It will be seen that at the left of the diagram, where the unit cross section is filled by 16 of the larger spheres, there remain 16 large pores between them, through which the fluid may flow; in the center section of the diagram where the spheres have just one-half the diameter, it requires the equivalent of 64 spheres to fill the same cross section, thus forming four times as many pores through which the fluid may flow, but leaving each pore only one-fourth the area of cross section. Then, again, on the right, where the spheres or grains have a diameter only one-fourth that of the largest spheres, it requires 256 grains to fill the sections which form the same number of smaller pores, but each one has only one-sixteenth of the area of cross section possessed by the largest pore. In such cases as these, where the formation consists of grains first of one and then of another size, the fluid would be forced to travel in one case in 16 streams and in another in 64 streams, while among the grains of the third size there would be 256 streams moving along the same unit area of cross section.

From the foregoing it may be seen that the relative area of the pore space for spherical grains is not altered by their diameters as long as all have the same value and are packed in a like manner; quite the opposite is true with the diameter of the pores through which fluids may move, for doubling the diameter of the grain or sphere increases the area of cross section four times, and permits an increase in flow which is more rapid than the increase in diameter.

Diagram II shows clearly the volumetric relation of the pore space to the solid spherical grains when they are placed in the most compact arrangement possible. As a general rule the porosity of sands varies between 33 and 39 per cent of voids. It will then be plainly seen that the coarseness of the grains of the materials making up a specific formation has an extremely important effect on producing areas that will or will not "take fluid" under varying pressures with resulting losses of circulation.

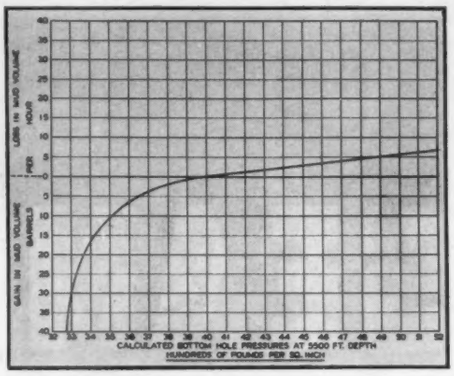
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Diagram No. 3—Gain or loss of drilling fluid under various bottom-hole pressures Middle Dome area, Kettleman Hills, California

As the size of the grain particles decreases the size of the individual pore channels approach capillary dimensions with correspondingly high frictional resistance to the passage of fluid. It will then be readily understood that such channels can be effectively blocked by the introduction of any inert material that is finely enough divided to readily enter the pore spaces.

In the foregoing paragraphs we have considered something of the structural composition of the sands through which circulation may be lost; as a matter of fact, except for fissures and crevasses, sands and limestones are about the only materials that will "take fluid" as shales and denser rocks are rarely porous enough. It therefore remains to be considered what portion of the drilling fluid is so absorbed and what steps will result in the mitigation of such losses.

In this connection the various forms of testing apparatus now in the hands of investigators along these lines have been of great assistance. Reference has been made to the "Mud Performance Testing Machine" described and used by Jones and Babson. There are several of these machines available for testing work by those interested, and their use has become quite general.

Repeated tests, using this apparatus, have indicated that the thickness of the mud cake deposited on the walls of the hole can be controlled, and as a most highly important corollary, the amount of fluid which enters the formation from the drilling fluid can similarly be controlled.

The following statement may be considered in its effect on modern drilling practice—clear water will enter the pore space of any sand freely and its behavior will follow the laws of capillary flow and resistance and is dependent on the size and number of channels around the grains comprising the formation; as indicated in the earlier portion of this paper.

It will thus be seen that in using water alone as a drilling fluid; when the hydraulic pressure in the hole is greater than the formation pressure, the water will enter the formation more or less freely. This will result not only in a loss of fluid, but what is worse, contamination of the formation. Once water is in the formation, it is extremely difficult to dislodge as the tension of the surface film of water surrounding each sand particle resists breakdown to a marked degree and renders the flow of oil or gas through such affected areas extremely difficult. The prevention of such water penetration is a relatively simple matter when understood and prevention measures should be employed in all cases where water is

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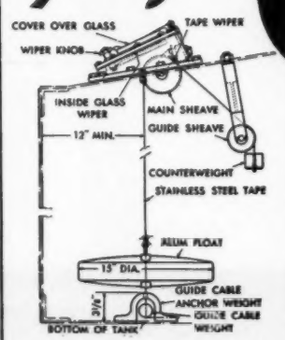

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used as a drilling fluid. The addition of 3 to 5 per cent of a colloidal material, such as bentonite, to the water will not only assist drilling by increasing the thixotropic qualities of the fluid; thus rendering the handling of the cuttings from the bit more easily, but will almost entirely prevent the fluid as mixed, or water from the fluid, entering the formation. The increase in the weight of the fluid by such addition is almost negligible. The sealing action caused by the addition of the colloidal material consists in the formation of an almost impervious cake on and in the walls of the hole. Such a deposit has repeatedly been proven able to resist the passage of fluid under pressures as high as several thousands of pounds per square inch. However, the penetration of the colloidal material (bentonite usually) into the formation is negligible. The author has examined numerous test samples which have been submitted to differential pressures as high as 2,500 pounds per square inch through long periods of time and which have allowed only a negligible quantity of fluid to pass. In none of such cases examined has the penetration of the colloidal material exceeded two and one-half times the grain size of the formation.

The thickness of the cake on the walls of the hole within reasonable limits, is immaterial and as has been explained in divers other papers, is a controllable function of the properties of the drilling fluid.

Further, the deposit of the normally extremely thin cake of colloidal material on and in the walls of the hole does not constitute a bar to subsequent testing, or ultimate production of zones protected by such cakes. Repeated tests have shown that when the pressure in the hole is reduced, a reversed differential pressure of a small fraction of the former "hole side" pressure will readily dislodge the cake and permit free flow from the formation to the well. In fact, in many cases a differential pressure of 2 or 3 pounds per square inch has been found amply sufficient.

The Blocking of Large Voids

The foregoing principle and practice can be applied to formations composed of materials of such coarseness that the pore spaces may be considered as having attained almost crevice or fissure proportions. Referring, for example, to tests made on crushed and washed rock such as enters into concrete aggregates. The rock used for the test in question was of a size that would be retained on a three-eighths inch mesh screen and would pass through a one-half inch mesh screen. Certainly a porous material, and one that water or ordinary mud laden fluid will flow through with practically no resistance. To shut off the flow through such material, it is necessary to add to the colloidal laden fluid a quantity of fibrous material; several types of fibre have been used with equally good results. The fibres form a base for the support of the coagulated colloids. Here again the penetration of a cake which will completely seal a formation, as described in the paragraph next above, is usually less than two and one-half diameters of the grain size of the formation. In several cases noted, the penetration was not more than three-fourths of an inch. Further, in cases of such coarse material there is surprisingly little loss of the fluid during the building up of the cake. The cake thus formed, containing a binder, so to speak, is somewhat more difficult to dislodge on reversal of the pressure than a simple cake composed of colloids alone. This latter fact is not important as it is rarely desirable to reopen such formations when they have been once sealed.

Other Methods of Preventing Losses

There are various other compounds which have been used with considerable success for sealing off formations. Several of these are of patent or undisclosed composition and most of them consist in the introduction of a chemical agent or compound into the drilling fluid which is then forced in or against the formation. A second chemical is then pumped into contact with the first one which by chemical or physical interaction effects the precipitation of a solid deposit, effectively sealing the formation. Such procedure has met with considerable success commercially and has widespread use. The difficulty in handling such materials being to obtain an adequate contact of the second fluid

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with the first so that the precipitate may form where desired. The use of chemical compounds in which the resulting precipitate is a carbonate has been used with very considerable success in cases where it is desirable to remove the precipitate after it has served its purpose. In these cases the later use of an acid will generally alter the precipitated carbonate salt which has the effect of removing the binder element so that the remainder of the precipitate can be dissolved or washed away, thus freeing the formation and permitting the resumption of circulation through it. It is further understood that the dissolving of precipitates formed as above, is also accomplished in one or more of the patented or undisclosed processes where carbonates do not form the basis of the precipitated compound.

The behavior of the various wells in the Middle Dome area of the Kettleman Hills field is interesting in light of the foregoing paragraphs.

In this area salt water under a combined hydraulic and gas pressure of 4,000 pounds per square inch is encountered at depths of approximately 5,500 feet. This requires the wells to be kept filled with mud fluid of a weight of 104.5 pounds per cubic foot (14 pounds per gallon) in order to balance the formation pressure. This pressure must be constantly maintained as even a slight reduction results in an influx of considerable quantities of salt water to the ruination of the batch of costly weighted mud then being used for drilling. Further, great care is required to see that the bit is moved slowly when coming out of the hole, as even at moderate speeds its "swabbing" action is liable to lower the pressure behind the bit sufficiently to allow the water to follow in its wake. Further, upon experimenting with these wells, it is found that lowering the mud fluid weight to 86 pounds per cubic foot (11.6 pounds per gallon) allows 40 bbls. of water per hour to enter the well; 89 pounds per cubic foot (11.9 pounds per gallon) mud allows 17 bbls. per hour to enter. The interesting feature, however, is that the relation between the formation pressure, the back pressure in the hole, and the amount of water moved is not apparently a reversible relation. There seemed to be set up an osmotic condition in which the mud sheath in the hole acts as a semi-permeable membrane, allowing the water to pass readily out of the formation into the hole but does not allow the mud laden fluid, nor water from it, to return to the formation upon reversing the pressures. This is demonstratable by the fact that increasing the mud weight up to 118 pounds per cubic foot (15.9 pounds per gallon) which has the effect of increasing the pressure against the formation to 4,500 pounds per square inch resulted in forcing the mud laden fluid into the formation at the rate of only 3 bbls. per hour. A further increase of the pressure equivalent to a mud weight of 133 pounds per cubic foot (18 pounds per gallon) causing a total pressure against the formation of 5,100 pounds per square inch resulted in forcing fluid back into the formation at the rate of approximately 6 bbls. per hour. Diagram III is a curve on which is plotted composite data obtained from several wells in this area and shows this phenomena in detail.

The explanation of the above is relevant in that it entirely supports the theories advanced in the previous paragraphs of this paper covering the control of circulation losses. It is as follows: First, the brown shale formation which carries the salt water flow, contains considerable content of bentonite of colloidal dimensions. Secondly, weighted mud is invariably used in drilling and the material forming the added weight is kept suspended by the addition of bentonite to the mud. The quantity of colloidal material thus present is sufficient to act as previously described and successfully resist the action of pressure increases attempting to force the fluid out of the hole. However, as explained, the colloidal material enters the formation so slightly that a relatively small differential between the formation pressure and the pressure in the hole will allow a dislodgement of the obstructing material and the water to enter the well with relative freedom.

Conclusions

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However, due to the capillary size of the pore spaces, they may be readily blocked by the introduction of a small amount of colloidal material deposited in the mouths of the capillary tubes comprising them. This blocking forms an impervious seal against fluid encroachment, thus protecting the formation from contamination as well as preventing losses of the fluid itself. The actual penetration of such colloidal material into the formation is very slight and has been found to be readily removable upon reversal of the pressures.

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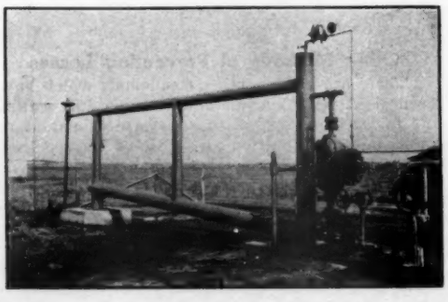

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Unsaturates in Gasoline With Methods for Determining

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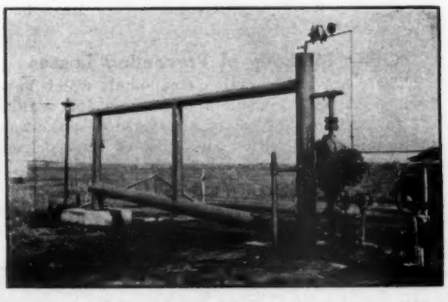

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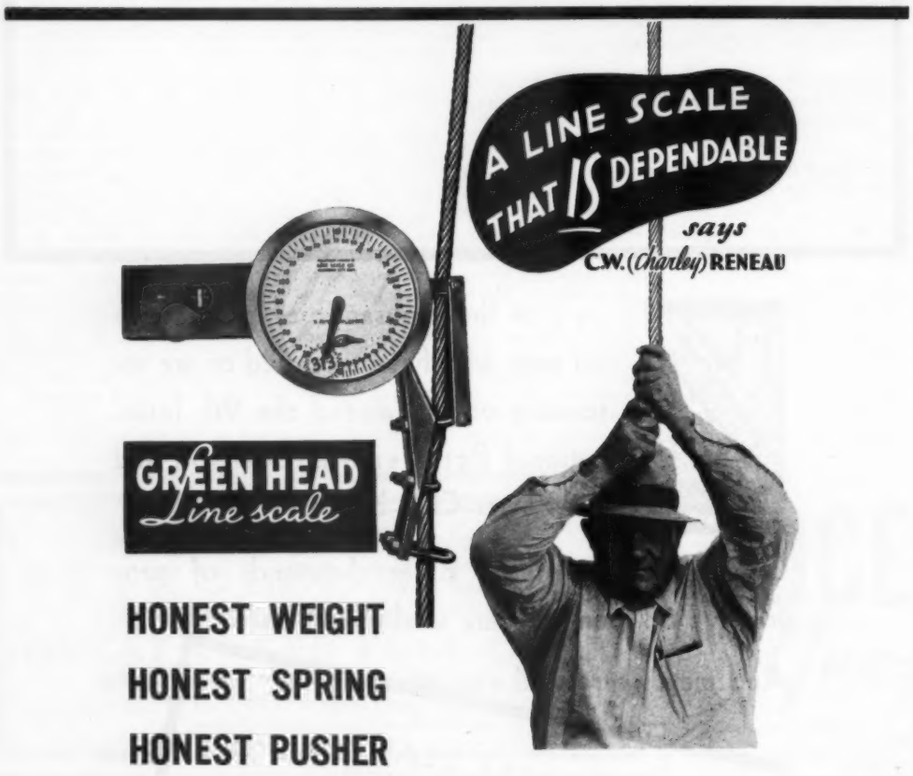

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The apparatus, essentially as it is today, for making the distillation test, was designed by Charles K. Francis in the laboratories of Cosden & Co., now the Mid-Continent Petroleum Corp., Tulsa, Okla. This was later adopted as the standard, with minor modifactions, by the American Society for Testing Materials.

The only changes made in the distillation specifications for U. S. Motor gasoline in recent years have been to specify the temperatures at which 10, 50 and 90 per cent shall be evaporated, and the endpoint 437° is not mentioned.

Reference: Francis, Development of Gasoline Specifications, The Oil and Gas Journal, October 22, 1931, p. 30.

PROBLEMS FROM READERS

Edited by T. F. Smiley

Much Remains to Be Found Out About Origin of Petroleum

Have the geologists and the chemists ever come to complete agreement on the question of how our petroleum originated? When I was a boy they taught us that great masses of vegetation under pressure formed the coal which we burned in our stoves in those days. They told us that coal, if it was not mined but was left underground, in the course of centuries became petroleum. In later years I read many articles touching on this subject. One of them advanced the idea that oil was formed from fishes. Other theories were given. It seems as though the scientists ought to have found out something definite by this time.—S. E. D.

Much remains to be determined concerning the question of how petroleum originated. Progress has been made, but it cannot be said yet that complete agreement has been reached. One theory formerly held has been discarded by virtually all scientists who have studied the subject. That is the theory that inorganic matter explains the presence of oil and gas in commercial quantities underground. Geologists and chemists generally now agree that the original source material was organic in its character. Agreement beyond that point remains to be attained. Some strongly contend that animals provided the source material. Others just as strongly argue for plant remains. A growing number of students are disposed to believe that both these sources contributed to oil material and that the proportions of each and of the varying types of life within each group have differed in various localities.

In his work on the geology of petroleum and natural gas Dr. Ernest Raymond Lilley says that the manner of transportation, deposition and preservation of the organic debris is a subject of debate. Probably the greatest controversy centers around the nature of the connecting link between the organic debris and the oil. Murray Stuart and other English geologists consider that the organic matter was converted into oil before its burial in those areas where it has formed free oil. They assert the free oil is largely a process of breaking down the adhesion of oil for clay particles and expelling the oil to the more porous rocks. Mr. Stuart regards the kerogen or oil shale to be the product of the burial of organic matter which has not been converted into oil and he believes such shales never can be considered as the source of free oil.

Most American geologists consider the chemical action up to the time of burial as instrumental only in creating a substance of low oxygen content from which oil may be generated later by heat or pressure or both. They look upon kerogen or oil shale as an intermediate substance in the change of organic matter into petroleum. They believe definite chemical changes must occur before it can be converted into free oil.

Doctor Lilley himself believes the evidence favors the view kerogen is an intermediate substance between the organic debris and the petroleum and that its conversion into the latter calls for chemical and physical changes. These may be brought about by forces available within the earth's crust. The nature of the oil formed in this way will vary somewhat with the chemical nature of the original source materials and with the manner of application of the forces causing its generation, but it appears to be of rather viscous and heavy character and to contain substantial percentages of unstable compounds. Its subsequent alteration is determined by the nature of the agencies which affect it. Through interaction with the sulfur and other active ingredients contained in the substances with which it comes into contact it may become heavier and more viscous and gradually be converted into a solid of asphaltic nature. In other cases it may be subjected to processes of dynamic alteration and change into a more stable and lighter type of oil. Ultimately it may be transformed into a gas or be entirely destroyed. Of necessity this is a rather technical discussion, but it is hoped it answers your question as fully as it is possible to do it at this stage of study.

What Happens in the Well Hole When the Shot Is Exploded

I have been trying to ascertain as well as I can from such oil literature as I have just what occurs at the bottom of a well hole when a shot of nitroglycerine is set off. I know of course it has an immediate effect on production, but as nobody ever has seen what takes place, I am interested in knowing what the theory of engineers and geologists is concerning the action of the explosive. How would they picture it?—N. O. G.

It cannot be stated positively just what occurs at the bottom of a hole when an explosive is set off there for the very reason you name. Nobody ever saw it. But something is known about the action and effect of explosives on underground rock structures. Among opinions as to what happens these may be mentioned: (1) That the gases evolved by the explosion, rushing up and out of the hole, cause a partial vacuum, which draws oil from oil-bearing strata. (2) That the shock of the explosion, with resulting vibrations, causes effervescence of the gas-charged oil, making it bubble out of the hole like a carbonated beverage out of a bottle. (3) That the shock of the explosion sets up vibratory waves of disruptive intensity, which tends so to break down the strata as to open avenues of escape for gas-charged oil. The effect is like that of an earthquake.

WHY THEY CALLED IT *Ax*

The ax, which has done notable service in the development of oil fields, was one of the earliest tools, having been found among relics of the Stone, Bronze and Iron ages. It was fashioned sometimes of syenite or black sandstone, as by the lake dwellers of Europe; of jade, as by ancient people of Asia and Asia Minor and by the modern Maoris; of flint or bone, as by the American Indians; of mixed copper and tin, as by the Romans, ancient Mexicans and South Americans; of copper, as by the Druids. Just to see how well a stone ax was made in the Stone age, some 10,000 years ago, Dr. Nels Nelson, of the American Museum of Natural History, New York, took out one of the museum specimens and cut down a 4-foot maple tree in six minutes. The word "ax," spelled the same way in Middle English, is traced to the Latin "ascia."

Wants Information About Method of Maintaining Fluid Back Pressure

I want to get some information about a method of maintaining a constant fluid level in a well which makes use of a perforated liner set into the oil sand and packed off above the top of the sand. The tubing is set inside this liner and there is an arrangement by which gas may escape from between the liner and the tubing. Possibly you can give me details about the method.—N. E. T.

The method of maintaining back pressure on a sand to which you refer is evidently one which was described by J. O. Lewis in a bulletin of the U. S. Bureau of Mines and which is called "maintaining fluid back pressure." When this method is employed a liner perforated at the bottom is set into the oil sand and packed off above the top of the sand. The tubing, set inside the liner, rests on a tubing-ring at the top of the liner. This tubing-ring is perforated or notched so that gas may escape from the tubing and liner.

The working barrel is set high with a flood nipple below, and when the fluid is pumped down to this point, air or gas (resulting from a drive application) is let in and the fluid cannot be lowered below this level. The flood nipple is so placed that the weight of the column of fluid held in the liner between the top perforations and the fluid nipple approximately equalizes the pressure of the well when closed in. If the pressure is 25 pounds, the flood nipple should be placed about 60 feet above the top perforations in the liner. In a well finished as described in the bulletin, the air or gas accumulates below the packer and bears down on the fluid in the well, forcing it up into the liner and the tubing. Before the fluid has accumulated to such a height that the pressure head is equal to the air or gas pressure, the air or gas may escape readily, but after its pressure has been counterbalanced by the fluid column, the air-gas is sealed in and little can escape. As more oil accumulates it rises equally in the shot hole and in the liner, so that the same difference in level and, consequently, the same fluid pressure are maintained against the air-gas pressure, though the fluid pressure at the bottom of the oil sand is increased somewhat.

In this manner the oil can accumulate until the shot hole is filled with it. When the well is pumped, the fluid levels within the liner and in the shot hole are lowered equally until they have reached the flood nipple and almost to the top perforations in the liner, respectively. When this point is reached the well ceases to pump oil.

Instead of finishing the well with a liner, a complete string of casing can be landed at the bottom and shut in at the top, the tubing and flood nipple being placed in the same position in regard to the fluid column as described. This method has the advantage that the pressure can be gauged easily and continuously, and the position of the flood nipple be changed readily, but unless another string of casing is landed on the top of the sand the gas may escape into other formations or shale may slough off the walls and fall into the hole. Sometimes the flood nipple is omitted and the working barrel is placed low in the well. When the fluid is pumped below the counterbalancing level, there is a sudden inrush of air or gas which brings in oil from the sand into the hole. When the pumping is stopped, the fluid rises again and stops the rush of air or gas. By this method a sudden release of the gas takes place every time the well is pumped down.

As the conditions change in the field, it will be necessary, from time to time, to change the back pressure used.

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Degree of Reduction in the East Texas Basin As an Index of Source Beds

By PARKER D. TRASK* and W. ROSS KEYTE†

The American Petroleum Institute and the U. S. Geological Survey for the past several years have been undertaking an investigation of source beds. Source beds are the rocks in the ground that contain substances from which petroleum has been or can be generated. In prospecting for oil it is of distinct financial advantage to the oil operator to know the extent to which oil-forming rocks are present in the areas in which he is interested. The main object of this investigation on source beds is to develop criteria which will enable a geologist to recognize oil-forming rocks and thus help in lessening the cost of finding oil.

In this work several possible means of recognizing source beds have been considered,[1a] but for the past 18 months attention has been concentrated on the degree of reduction of the sediments. The degree of reduction is a rough index of the oxygen content of the organic matter in the sediments. Petroleum consists of compounds low in oxygen and high in hydrogen. The materials from which it is generated accordingly, may be expected to be relatively rich in reduced substances, i.e., in substances of relatively low oxygen content. An attempt is being made at present to ascertain if the state of reduction of sediments may be used as an index of source beds.

In such work it would be highly desirable to analyze sediments definitely known to be source beds to see if they actually are reduced in comparison with ordinary sediments, but unfortunately no beds are known with absolute certainty to be source beds. At present the assumption is being made that sediments associated with oil zones, or which lie in or near the same stratigraphic zones as those in which the oil is found, ordinarily are source beds. As a general rule, this assumption seems reasonable; because the nearer a favorable reservoir is to the source of the oil, the greater is the likelihood that oil will accumulate in it. However, petroleum by no means will invariably accumulate near its place of origin. Thus any attempt to use beds associated with oil zones as source beds may lead to anomalous results. Some sediments associated with oil zones may never have yielded any oil, and other sediments associated with barren zones may have generated much oil which has migrated to other rocks. Moreover, the sediments adjacent to the oil zones may vary in their capacity to generate oil, and the sequence of sediments that are arbitrarily assumed to be close enough to the oil zones to be sources of oil may contain a considerable proportion of beds that are not source beds.

Thus if a few areas are studied in this manner, the laws of chance might operate in such a way that the significance of certain characteristics of source beds might be masked; but if a large number of producing areas from several petroliferous provinces are investigated, the law of averages should prevail, and the real significance of the particular characteristics should become apparent (provided, of course, the basic assumption is correct, viz., that the sediments associated with oil zones are the main source of oil in those zones).

The relationship of the degree of reduction of the sediments to the occurrence of oil has already been investigated in a preliminary way in two petroliferous provinces: 1, Wyoming and Colorado;[2] and, 2, Oklahoma and Kansas.[3] In Wyoming and Colorado the oil zones are more commonly associated with sediments having a high degree of reduction than they are with sediments having a low degree of reduction. In Oklahoma and Kansas a similar relationship was observed; very few formations in which the degree of reduction is high

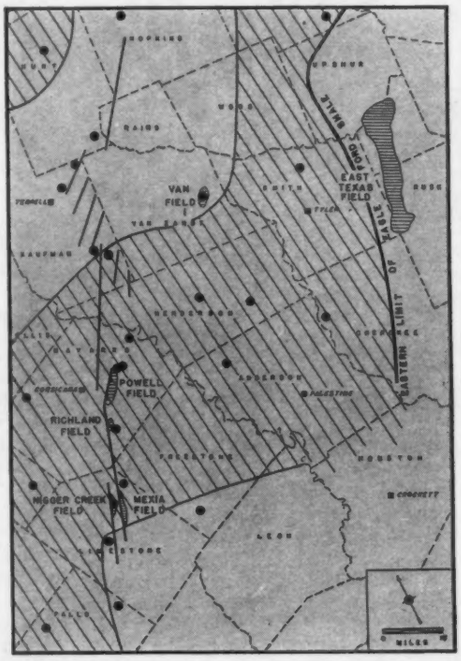


Fig. 1—Nitrogen-reduction ratio for the Eagle Ford shale. Shading indicates areas in which the nitrogen-reduction ratio is lower than the average for the formation. Wells from which samples were obtained are shown by dots

are associated with barren zones, and few in which it is low are associated with producing zones.

The object of this paper is to discuss the relationship of the degree of reduction in another petroliferous province, viz., the East Texas basin. It has not yet been possible to complete the analyses of the 3,300 samples that have been collected from this region, but the data that have thus far been obtained are presented in order to make a preliminary appraisal of the reliability of the relationship of high-degree reduction to the occurrence of oil in this general region.

***A.P.I.*—Presented Mid-Year meeting of American Petroleum Institute, Tulsa, May 15, 1936.**

Methods of Analysis

As the methods of analysis have been discussed previously,[4] they are not described in detail here. The measure of the degree of reduction that is used is a ratio of the reducing power to the organic content of the sediments. The reducing power is expressed in terms of the number of cubic centimeters of 0.4 nchromic acid that can be reduced by 100 milligrams of sediment. The organic content ordinarily is estimated from the carbon or nitrogen content. This would be a satisfactory procedure if the proportion of carbon and nitrogen in the organic constituents were constant; but, as these elements vary in amount in the organic constituents of different sediments, they cannot be used as absolute measures for the organic content. Carbon is present in much larger quantity, and presumably is less variable, than nitrogen.[5] The carbon content, therefore, is a better measure for indicating the organic content.

However, for preliminary studies, nitrogen is more satisfactory to use. The method for analyzing nitrogen is four times faster than carbon, and the probable error of individual analysis is only one-fourth as much as for carbon. Thus, when a general appraisal of a large group of sediments is desired, these advantages considerably more than offset the disadvantage of nitrogen being a less reliable index of the organic content. The degree of reduction, therefore, in this paper is considered in terms of the ratio of the reducing power to the nitrogen content—although, to accord with previous practice,[6] the inverse form of the ratio, viz., the nitrogen content divided by the reducing power, is used. This nitrogen reduction ratio is a very definite empirical entity; and, despite the fact that it may not be a completely reliable index of the state of reduction of the sediments, is a very convenient characteristic of sediments to study in connection with source beds.

The lower this nitrogen-reduction ratio is, in general, the greater is the degree of reduction (variations in the proportion of nitrogen in the organic matter not being considered). The ratio is presented in the form of 100 times the percentage of nitrogen divided by the reducing power. This ratio ranges mainly between 3.0 and 9.0 in the sediments that have thus far been analyzed, and the average is of the order of magnitude of 6.0. As the program of analyses planned for the East Texas basin is not yet completed, numerical data are not given in this paper. Instead, the results are presented in terms of deviation from the average ratio. If the ratios are significantly less than the average, the sediments are regarded as having a high degree of reduction; and if they are distinctly greater than average, the sediments are considered as having a low degree of reduction.

Geologic Relations

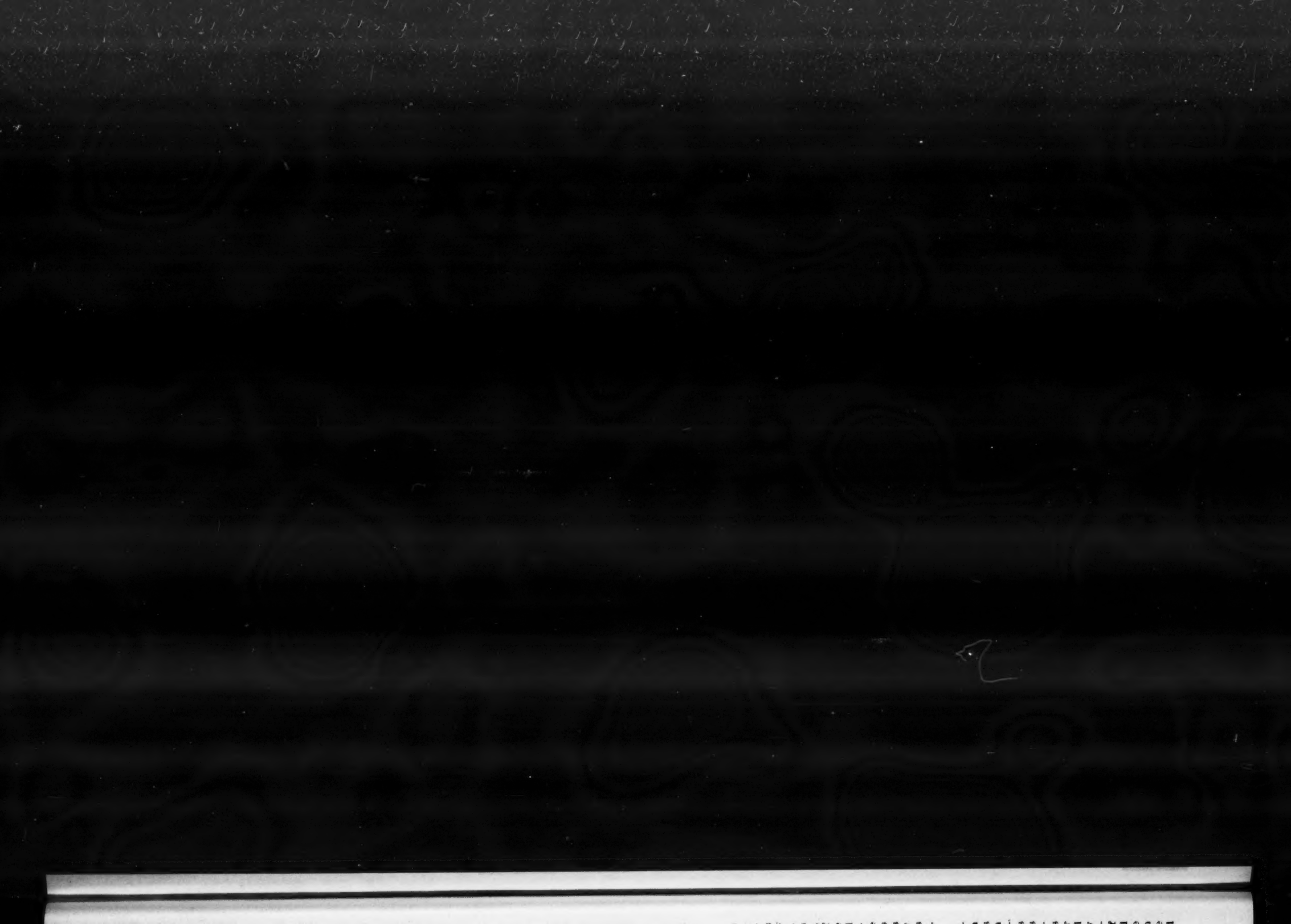
The East Texas basin is a structural basin situated in Northeast Texas in the area shown in Figures 1, 2, and 3. The formations from this area that are discussed in this report range in age from early Lower Cretaceous to Lower Eocene.[7] The general nature of these formations is indicated in Table 1. The thicknesses given in this table indicate only the general order of magnitude; most of the formations vary in thickness throughout the area—and in a preliminary paper such as this is impracticable to discuss in detail the changes in thickness. In general, the Tertiary formations thicken southeastward, and the Cretaceous formations thicken toward the center of the East Texas basin. A few anticlines are found in the basin, several of which presumably are due to intrusions of salt. Some of these anticlines, such as the area around the Van field, probably were in existence in Cretaceous time, as is indicated

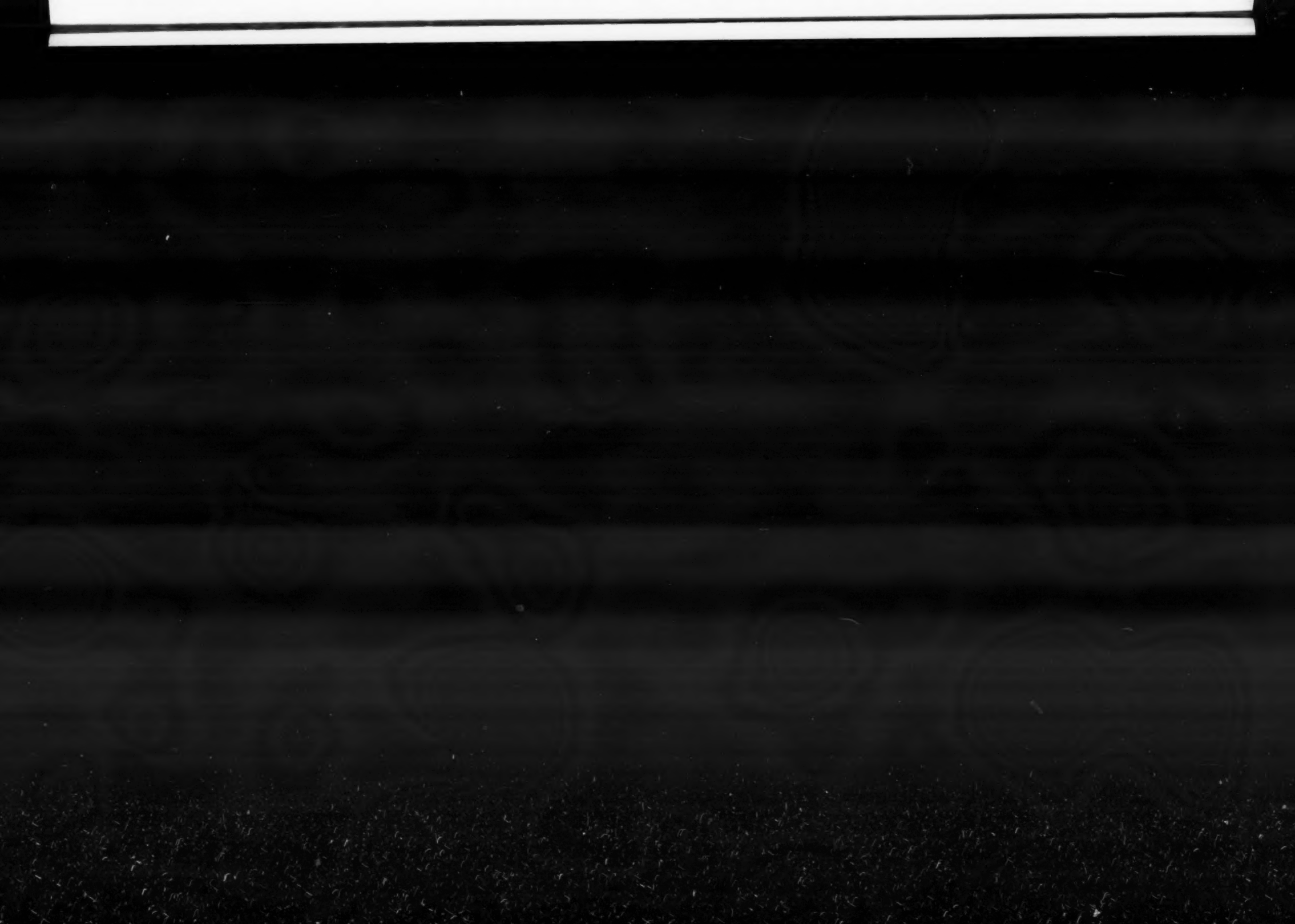
*U. S. Geological Survey, Washington, D. C. (Director, American Petroleum Institute Research Project on Source Beds).

†Midland, Tex. (formerly research fellow, American Petroleum Institute). Published by permission of the Director, U. S. Geological Survey.

*Figures refer to bibliography.

(The statements and opinions expressed herein are those of the author, and should not be construed as an official action or opinion of the Institute.)





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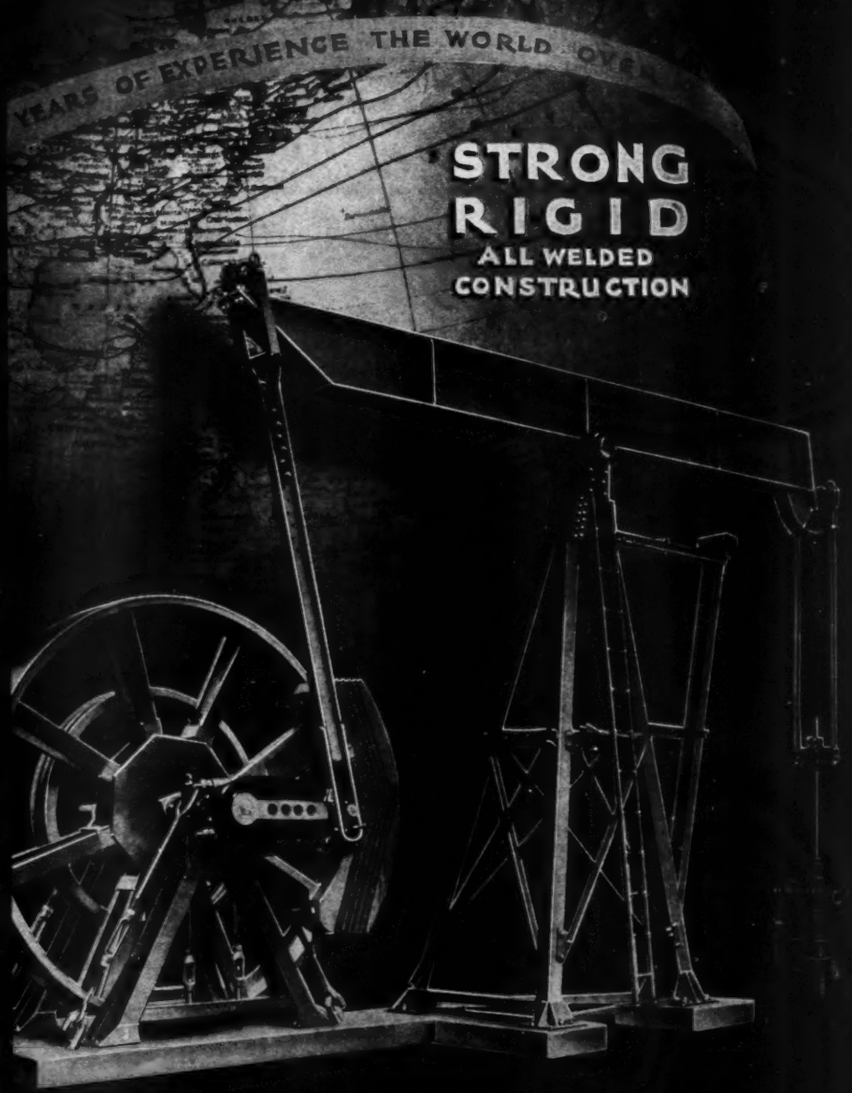

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by the thinning of the sediments on the crest of the anticline[8]. The western part of the basin is cut by a series of normal faults (Figures 1, 2 and 3) some of which are associated with oil fields. This faulted area is called the Mexia fault zone.

Oil and Gas

Oil and gas are found in several horizons throughout the East Texas basin.[9] The main producing horizon is the Woodbine sand. This formation yields oil in the East Texas and Van fields and in several areas in the southern part of the Mexia fault zone. The Woodbine does not contain oil in apparently favorable structures in the northern part of the faulted area or in the Kelsey structure, 15 miles northwest of the northern end of the East Texas field.

Sands in the Navarro and Taylor formations in the Upper Cretaceous have yielded minor quantities of oil in several places in the south end of the faulted area shown in Figures 1, 2 and 3. The Fredericksburg group of Lower Cretaceous age produces oil in the Luling area about 100 miles southwest of the areas shown in Figures 1, 2 and 3. The Trinity yields oil and gas in the Rodessa field of Caddo Parish (Louisiana) and adjacent Marion County (Texas); oil in Titus and Franklin Counties (Texas); gas in the Cayuga field of Anderson County (Texas) and oil in small fields west of the East Texas basin. The Eocene yields a small amount of oil in two or three fields in the East Texas basin south of the area shown in Figure 1, and produces much oil in the Coastal region still farther south. None of the samples examined in connection with this report came from areas in which the Eocene is oil-bearing.

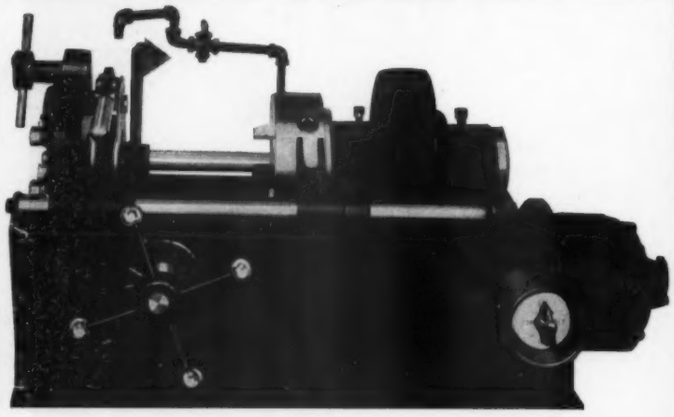
Gas has been encountered in all the formations listed above in which oil has been found. In addition, parts of the Washita group have yielded minor quantities of gas in a few areas.

Samples Studied

This report is based on 3,300 samples from more than 50 wells. Upon the basis of preliminary analyses which indicated the general nature of the sediments, 750 samples were chosen for determination of the nitrogen-reduction ratio. About one-half of these samples come from various parts of the East Texas basin, and represent the Austin chalk, the Eagle Ford shale, the Woodbine sand, and the upper part of the Washita group. The other half come mainly from the vicinity of the East Texas field, and represent formations ranging from Eocene to Lower Cretaceous. The locations of the samples are indicated in Figures 1, 2 and 3.

Data on the organic content and volatility of these sediments have been presented in a previous report.[10] In general, they contain between 1.5 and 4 per cent organic matter. The Eagle Ford shale has the maximum amount; it contains from 2 to 4 per cent organic matter throughout most of the area. The content is greatest in the center of the East Texas basin, and it is also high in the vicinity of the oil fields in the southern part of the faulted area on the west side of the basin. The organic content of the Austin chalk and Woodbine formation likewise tends to increase toward the southwest side of the basin. The volatility of the Eagle Ford shale similarly is greatest in the southwest part of the area. Thus the sediments associated with the oil zones in the southwest part of the basin are relatively rich in organic matter and in volatile constituents compared with the sediments in the barren area farther north.

The nitrogen-reduction ratio was averaged for each formation encountered in the wells from which samples were obtained. The results were plotted upon maps, and lines were drawn separating areas in which the ratio was higher from those in which it was lower than the general average for that formation. The areal distribution of the nitrogen-reduction ratio for three of the formations is shown in Figures 1, 2 and 3, viz., the Austin chalk, Eagle Ford shale, and Woodbine sand. Insufficient data are available to warrant the presentation of maps for the other formations. Data for other formations, along a north-south section in the east part of the field, how-



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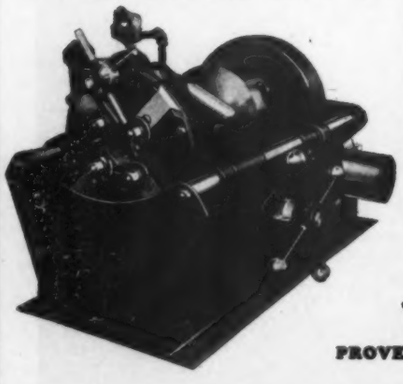

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ever, are presented in Table 2. This section includes the Monitor Merrell well 30 miles north of the East Texas field, the Amerada Wade well on the Kelsey structure 15 miles northwest of the field, the Sinclair Holland No. 4 well near the south end of the East Texas field, and the Sinclair McRae No. 1 well a few miles south of the field (Figure 3). A well from the Van field in the north-central part of the basin is also included in the table.

Areal Distribution of Ratios; Possible Sources of Oil

The sediments considered as the principal sources of most of the oil in the East Texas basin are

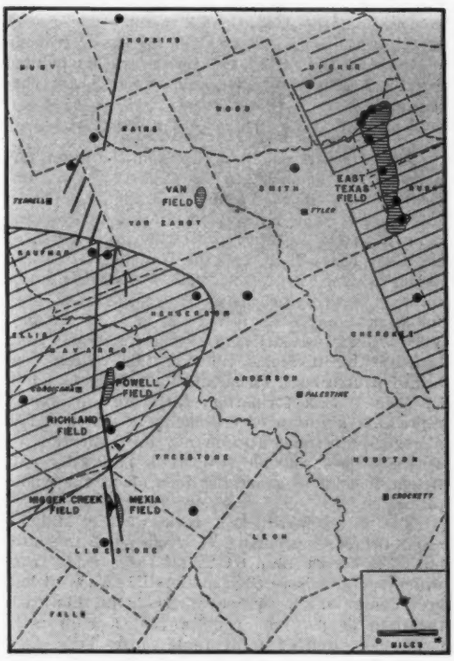

Fig. 2—Nitrogen-reduction ratio for the Woodbine sand. Shading indicates areas in which the nitrogen-reduction ratio is lower than the average for the formation. Wells from which samples were obtained are shown by dots

the Austin chalk, Eagle Ford shale, Woodbine sand, and Washita group. The Eagle Ford shale —because of its dark color, bituminous nature, and position immediately overlying the Woodbine sand —has commonly been regarded as a major source of oil. The Eagle Ford shale, however, pinches out on the east side of the basin, and is not present in the immensely productive East Texas field; but it is possible for oil to have migrated up the dip into the field from places where the Eagle Ford is present.

The Woodbine formation itself contains considerable shale, which might be a source of the oil now found in the formation. The underlying beds of the Washita group, consisting of shale and limestone, also might be a source of oil in the Woodbine sand. The Austin chalk overlies the Woodbine within the East Texas field, and also over a considerable area west of the field from which the oil might have been drained. The oil in the East Texas field, therefore, possibly might be derived from the Austin chalk. Thus in consideration of the geologic relations of the formations, the order of importance of the sediments as source beds would be: 1, Eagle Ford; 2, shale in Woodbine formation; 3, limestone and shale of the Washita group; 4, Austin chalk; and, 5, other formations. The distribution of the nitrogen-reduction ratio among the formations, accordingly, will be taken up in that order.

Eagle Ford Shale

The nitrogen-reduction ratio of the Eagle Ford shale, in general, is less than 6.0, and the average is 5.1. The sediments throughout almost the entire areal extent of the formation, as indicated by the available samples, therefore, have a relatively high degree of reduction. The data, therefore, in general, support the concept that sediments in which the nitrogen ratio is low are likely to be source beds.

The formation has the highest degree of reduction in a belt extending in a northeasterly direction across the south-central part of the East Texas basin (Figure 1). The producing areas in the fault-line field lie within the belt of maximum reduction. The average ratio in the producing areas in the faulted district is 4.6 compared with 5.5 in the barren areas lying farther north. The lower ratio, together with the greater organic content and greater volatility in the producing areas, compared with the barren areas, may possibly indicate that the Eagle Ford shale is a better source bed in the southern part of the faulted area than in the northern. The Eagle Ford does not extend as far as the East Texas field, but the nitrogen-reduction ratio is relatively low throughout the area in which it is possible that the Eagle Ford may have supplied oil to the East Texas field.

The ratio in the one well that was examined from the Van field is 5.3, which is only slightly less than the average of 5.5 for the northern part of the faulted area to the west. Thus, although the higher ratio in the northwest part of the basin compared with the southwest part is in accord with the concept of poorer source beds in the northwest area, the small difference between the ratios in the Van field and in the northwest part of the basin, together with the fact that with respect to sediments in general the ratio in the northwest part of the basin is relatively low, indicates that the Eagle Ford should not be disregarded as a source bed in the northwest part of the basin.

TABLE 1—GENERALIZED NATURE OF FORMATIONS IN THE EAST TEXAS BASIN THAT ARE CONSIDERED IN THIS REPORT

	(Feet)
EOCENE	
Wilcox formation: Sandstone, shale, and lignite, thickness increases southeastward	1,000 ±
Midway group: Shale, sandy shale, and minor beds of sandstone and limestone	800 ±
UPPER CRETACEOUS	
Navarro group: Mainly gray shale and marl. Thins eastward. Nacatoch sand, 200 ± feet thick lies in central part of group, and in places carries oil and gas	600 ±
Taylor marl: Consists mainly of marl, but in places contains considerable chalk. Sands associated with the chalky part of this formation carry gas and oil in some areas. Formation thickens toward center of basin	800 ±
Austin chalk: Mainly chalk; thickness decreases eastward. In east part of basin formation is approximately 125 feet thick, and rests with slight angular unconformity on underlying strata	300 ±
Eagle Ford shale: Mainly dark calcareous shale. Thickness decreases eastward. Formation is not present in East Texas field	300 ±
Woodbine sand: Mainly sand, but contains some shale and ash zones. Thickness increases toward center of basin; main oil zones of this area occur in the Woodbine sand. The combined thickness of Eagle Ford shale and Woodbine sand in center of East Texas basin may be as great as 1,000 feet	300 ±
LOWER CRETACEOUS	
Washita group: Mainly limestone, but contains some shale in upper part. Carries small amount of gas in places	300 ±
Fredericksburg group: Mainly limestone, but contains some calcareous shale in lower part. Carries oil and gas in places	500 ±
Trinity group: Consists of three formations—the upper and lower are dominantly sand with minor amounts of shale; the middle is dominantly limestone. All three formations carry gas and oil in areas around the edges of the East Texas basin	1,000 ±

TABLE 2—NITROGEN-REDUCTION RATIO OF EOCENE AND CRETACEOUS FORMATIONS IN NORTHEAST PART OF THE EAST TEXAS BASIN

Formation—	Well 1	2	3	4	5
	Nitrogen-Reduction Ratio				
Wilcox	—	..	—	..	..
Midway	+	..	+	0	..
Navarro	+	..	+	+	0
Taylor	—	..	+	+	—
Austin	—	—	..	+	0
Eagle Ford	—	..	..	..	—
Woodbine	..	—	—	..	..
Washita	..	—	..	..	..
Fredericksburg	..	0	..	..	..
Trinity	..	0	..	..	..

Location of wells is indicated in Figure 3. No. 1 is Monitor Merrell 1; No. 2 is Amerada Wade 1 from the Kelsey structure; No. 3 is Sinclair Holland 4; No. 4 is Sinclair McRae 1; and No. 5 is a well from the Van field. The nitrogen-reduction ratios are given in terms of deviation from averages; —, is less than 5.5; 0, between 5.5 and 6.5; and + greater than 6.5.

Woodbine Sand

The average nitrogen-reduction ratio of the Woodbine sand is approximately 5.5, which is slightly less than the average for sediments in general. The ratio is less than 5.5 in a wedge-shaped area in the western side of the East Texas basin and in the vicinity of the East Texas field (Figure 2). The area of low ratios

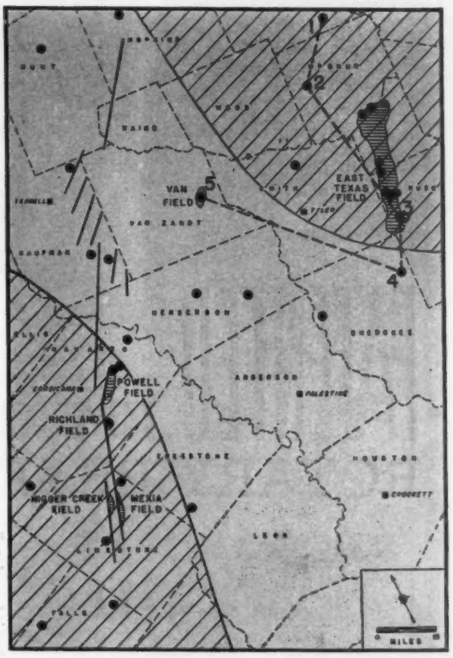

Fig. 3—Nitrogen-reduction ratio for the Austin chalk. Shading indicates areas in which the nitrogen-reduction ratio is lower than the average for the formation. Wells from which samples were obtained are shown by dots. Numbers show location of wells represented in Table 2.

on the west side of the basin lies partly in producing territory and partly in barren territory. The area extending westward into the basin from the East Texas field, from which a large part of the oil in the field could be derived if the Woodbine were the source, has a low ratio near the field and a high ratio away from the field. Thus the data on the distribution of the nitrogen-reduction ratio in the Woodbine formation in the East Texas basin, on the assumption that the Woodbine is the source of the oil, are not particularly conclusive, one way or the other, as to the reliability of the ratio as an index of source beds. There is, however, a tendency for the sediments in the vicinity of the well known oil pools to have lower ratios. The East Texas, Powell, and Richland fields lie in areas of low ratio. The Nigger Creek and Mexia fields lie close to the dividing line between high and low areas; and the Van field, from which no Woodbine samples are available, lies only 15 miles north of the dividing line.

Washita Group

The Washita group, because of its location beneath the producing zones in the Woodbine sand, has not been explored as much as the overlying formation. Consequently, relatively few samples have been obtained from it. The available data seem to indicate the average nitrogen-reduction ratio is slightly less than 6.0. Thus the results from the Washita group convey no distinctive implication, one way or the other, with respect to the degree of reduction being an index of source beds.

Austin Chalk

The nitrogen-reduction ratio in the Austin

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chalk averages slightly less than 6.0. The Austin is characterized by two areas of low ratios—one in the southwest part of the basin, and the other in the northeast part (Figure 3). The Austin chalk throughout the East Texas basin is barren of oil, and is characterized by high nitrogen-reduction ratios—except in the areas in which the Woodbine produces oil, viz., in the vicinity of the East Texas field, where the Woodbine formation directly underlies the Austin chalk, and in the southern part of the Mexia fault zone. The ratio also is low in the vicinity of Bastrop County 50 miles southwest of the area shown in Figure 2, where oil is found in the Austin chalk. The low ratios in the Austin chalk in the vicinity of the East Texas field and in the area around Bastrop County, if low ratios are an index of source beds, suggest that the Austin chalk might be the source of oil in these two areas. The similarity in composition of the oil in the two areas, as pointed out by Barton[11], likewise supports the same hypothesis.

Other Formations

The nitrogen-reduction ratios of the other formations are summarized in Table 2. The locations of the wells represented in Table 2 are shown in Figure 3. The Wilcox formation is represented by two wells: the Merrell well 30 miles north of the East Texas field, and the Holland well in the southern part of the field. The Wilcox has a low ratio in both these places, but no oil has been found in the Wilcox formation in their vicinity. The Wilcox formation contains numerous sand bodies; and it seems that, if the Wilcox contained source beds, oil should have been found in it. The Wilcox formation, therefore, apparently represents a group of sediments in which a low nitrogen-reduction ratio is not an indication of source beds—although two wells is hardly sufficient to lead to generalizations about the whole formation.

The nitrogen-reduction ratio of the Midway group decreases progressively from north to south, but it is higher than 6.0 in all three wells from which samples have been analyzed. As no oil has been found in the Midway deposits in this area, the data support the concept that a high ratio is an indication of unfavorable source beds.

The Navarro group has a ratio distinctly above the average on the east side of the basin, and slightly below average in the Van field. The ratio, therefore, seems to decrease westward. The Navarro carries oil in some of the faulted areas on the west side of the basin. This lower trend of the ratio westward, consequently, is in accord with the concept of a low ratio being a favorable indication of source beds.

The Taylor marl has a high ratio in the south end of the East Texas field; and a low ratio in the Merrell well 30 miles north of the field, and in the Van field 45 miles west of the field. Oil has been found in sands associated with the Taylor marl in the western part of the basin. The trend toward lower ratios westward favors the idea that low ratios are a characteristic of source beds.

The Lower Cretaceous formations have been reached in only one of the five wells represented in Table 2, viz., the Wade well 15 miles northwest of the East Texas field. No oil was found in this well. The nitrogen-reduction ratios in all the formations are approximately the same as for the average of sediments in general. The ratio is lowest in the Washita group, where it is 5.4. As the nitrogen-reduction ratios are so close to the general average ratio for sediments, no definite inferences can be made as to their reliability in indicating the ability of these Lower Cretaceous sediments to generate oil.

Conclusions

The data from the East Texas basin presented in this paper, in general, seem to support the concept that a low nitrogen-reduction ratio is a favorable indication of source beds, and a high ratio an unfavorable indication. Summarizing the relationships by formations, we find that it is unfavorable in the Wilcox; favorable in the Midway, Navarro, Taylor, Austin, and Eagle Ford; neutral, or perhaps slightly favorable, in the Woodbine and Washita; and neutral in the Fredericksburg and Trinity. The relationship, in general, is most favorable in those formations for

which the most data are available. It, accordingly, seems probable that a definite relationship between low nitrogen-reduction ratios and sediments associated with oil zones prevails in the East Texas basin. The relationship, therefore, has thus far been found to prevail in three oil regions: the Rocky Mountains, the Mid-Continent, and the East Texas basin. It is still possible, however, that this relationship may be apparent and not real; but each successive area in which it is found to hold strengthens the probability that it is real.

The relationship at present is being studied in three other petroliferous provinces; and, if it is found to prevail in each of them, the probabilities will be very great that it is a real relationship and, therefore, can be recommended to geologists as a practical tool in their research for petroleum. It should be borne in mind, however, that in each of the three regions which have already been examined, the relationship has not been found to hold universally. Consequently, the nitrogen-reduction ratio probably can never be expected to be an absolute index of source beds. Nevertheless, the chances now seem good that it may turn out to be a useful means of segregating sediments that are more likely to be source beds from those that are less likely to be source beds; and, if so, it should prove of economic value to the petroleum industry.

Acknowledgments

This paper represents joint work of the two authors. Trask wrote the paper and outlined the work. Keyte collected the samples, obtained the data on correlation of the samples, and made some of the chemical analyses. The analyses, however, were made mainly by H. E. Hammar, J. L. Stimson, R. W. Gillespie, R. V. Hughes, G. D. Johnson, and H. W. Patnode. Patnode, in addition, assisted in compiling the data and in preparing the figures. The analyses were made in the laboratories of the Division of Chemistry, National Bureau of Standards, Washington, D. C., and of the Engineering Department of Tulsa University, Tulsa, Okla. The writers appreciate greatly the friendly attitude of E. Wichers and R. L. Langenheim in connection with this laboratory work. Acknowledgment is due many officials of oil companies for their courtesy in supplying samples and aiding Keyte in correlating the samples.

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[11]D. R. Barton—Remarks made in paper presented at roundtable discussion sponsored by the Research Committee of the American Association of Petroleum Geologists, March 18, 1936.

Fred A. Noah, of Kansas City, Mo., of the firm of Noah & Young, independent oil operators, is in a hospital at Hays, Kans., where he is being treated for spinal injuries suffered when his automobile went into a ditch on a sharp curve in the road near Yocemento. Although badly injured, he was able to get the car out of the ditch and drive 7 miles into Hays, where he collapsed. Physicians said he would be in the hospital about eight weeks.

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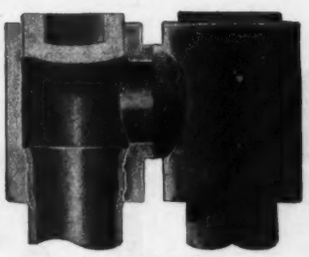

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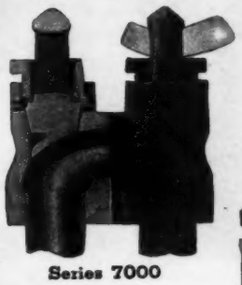

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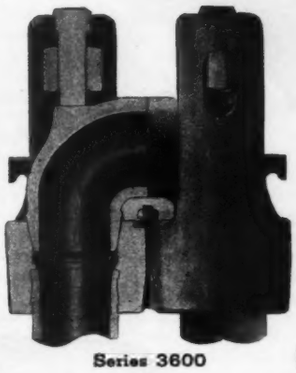

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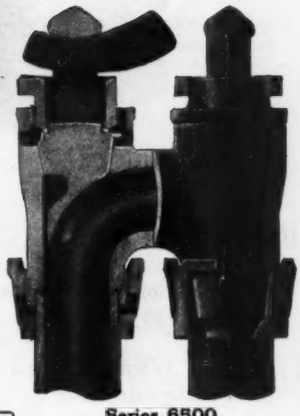

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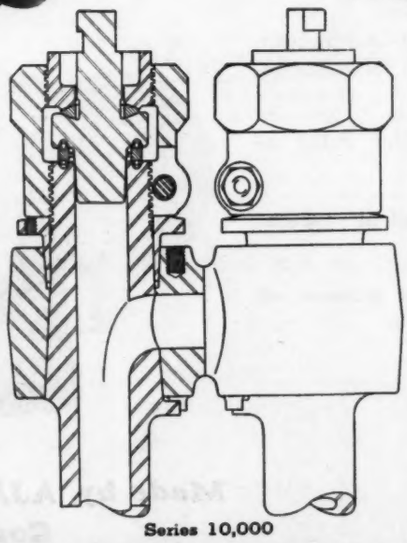

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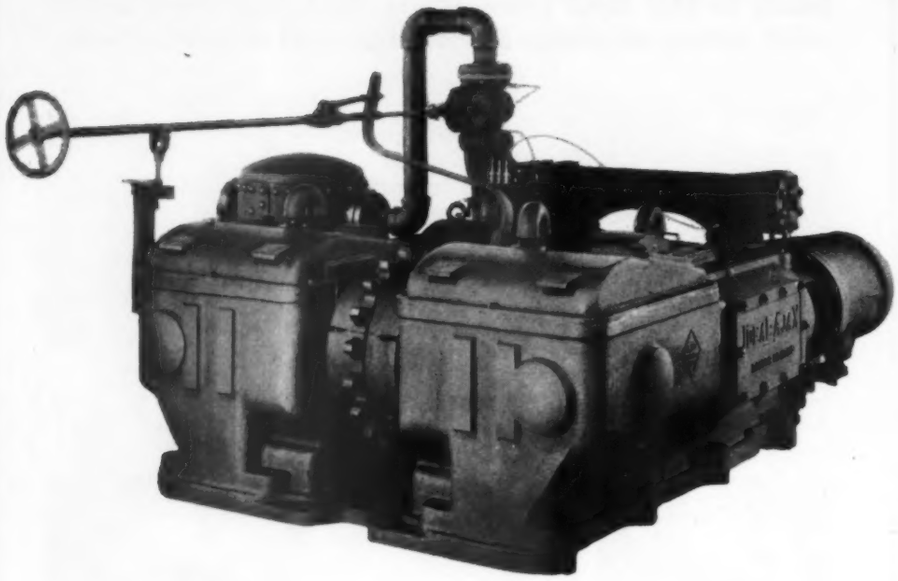

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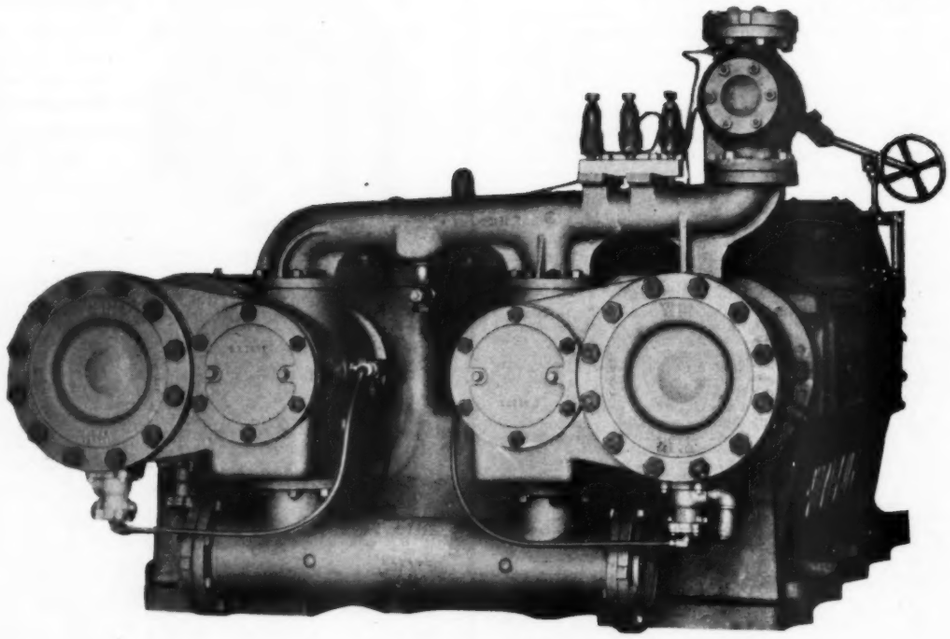

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Productivity Index

By M. L. HAIDER
The Carter Oil Co.

A.P.I.—Presented Mid-Year meeting of American Petroleum Institute, Tulsa, May 15, 1936.

The Topical Committee on Allocation of the American Petroleum Institute has stated that the factors involved in any proration program include productivity, acreage, reservoir pressure, sand thickness, minimum allowable, and volumetric withdrawal. It is not the purpose of this paper to discuss the factors which should be included, nor the weighting of the factors involved, but to discuss productivity. The fact is recognized that, in order to procure equity between the tracts or wells comprising the pool, it is necessary that the several factors be given proper weight in the allocation formula.

Open-Flow Potential

By productivity is meant the relative ability to produce oil. The productivity of a well should be an indication or measure of the producing quality of the strata within the drainage radius of the well. The methods of measuring productivity are many and varied, depending on the section of the country and pool in which the well is located. The method most commonly used in the past has been the open-flow potential through the casing. This method is gradually losing in favor with oil producers, as it has been found that it is inequitable, wasteful, and expensive, and not infrequently quite detrimental to the well and to the pool as a whole. Open-flow tests are not a true indication of the comparative ability of the formation to yield oil, due largely to the wide variance in size of equipment, such as casing, christmas trees, separators, etc. Under the system using open-flow potentials it behooves every operator to complete his well with as large a hole as possible in order to assure himself of maximum potential. It is estimated that, in the Oklahoma City pool alone, the use of oversize equipment cost the operators upwards of $10,000,000. The high rate of production during open-flow potentials greatly reduces the bottom-hole pressure, causing premature and uneven water encroachment, which results in lower recovery of oil and higher lifting costs.

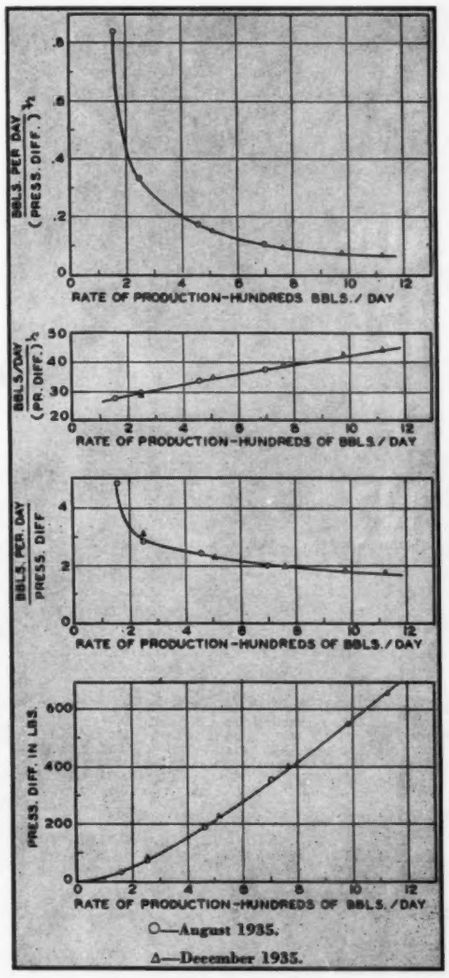
BBLS. PER DAY / (PRESS. DIFF.)½
RATE OF PRODUCTION-HUNDREDS BBLS./ DAY
BBLS./DAY / (PR. DIFF.)½
RATE OF PRODUCTION-HUNDREDS OF BBLS./ DAY
BBLS. PER DAY / PRESS. DIFF
RATE OF PRODUCTION-HUNDREDS OF BBLS./DAY
PRESS. DIFF. IN LBS.
RATE OF PRODUCTION-HUNDREDS OF BBLS./DAY
O—August 1935.
Δ—December 1935.

Fig. 1—Well A, Keokuk pool, Seminole County, Oklahoma

Restricted Potential

Due to the many disadvantages of the open-flow potential, the use of a restricted potential is becoming increasingly popular throughout the industry. The restricted potential may be taken through the casing, using a uniform size choke at the casinghead; but more frequently it is taken through uniform size tubing, with or without a surface choke. Where an open flow through the tubing is obtained, the tubing potential may be used without modification, or the relationship may be established between the open-flow and tubing potentials, and the open-flow potential determined indirectly thereafter from the use of the tubing potential. Tubing potentials are certainly desirable over open-flow tests. The chief disadvantage of tubing potentials is that they tend to "level out" the large-capacity wells due to the inability of the large well to demonstrate its full capacity. This is indicated by the fact that a large proportion of the wells shows approximately the same potential, although differences in their flowing pressures indicate that the ability of some to produce is greater or less than others. This objection is particularly applicable to tubing potentials employing a surface choke.

Productivity Index

A method of determining the relative productivity of a well without an open-flow test has been suggested by T. V. Moore.[1a] The use of this method involves measurement of the static bottom-hole pressure and the bottom-hole pressure while the well is flowing at various rates of production. This measure of the relative ability of a well to produce is termed its "productivity index," which is defined as the barrels per day produced per pound differential in pressure between static and flowing pressures. The productivity index is a measure of the ability of the producing formation to yield oil at the sand face; as it does not take into account the resistance of the flow string, but measures only the resistance of flow through the sand or producing formation. Productivity index is, therefore, the true measure of a well's ability to produce, and its use in an allocation formula would assure equity between wells or tracts. Use of the productivity index would obviate the necessity of competitive production methods by operators and the installation of over-size equipment.

Its Measurement

Although engineers are agreed on the many advantages of the productivity index, much remains to be learned about its actual measurement. There is a question as to whether or not the productivity index, as defined above, is a constant value for a given well at various rates of production. In order that it be a constant, the pressure differential must be a straight-line function of the rate of production according to the equation $y=mx+b$—with $b=0$, y=subsurface pressure differential, x=rate of production, and m, the slope of the line, is equal to the productivity index. Stanley Herold[2] indicates that the productivity index defined as the barrels per day per pound pressure differential

TABLE 1—FLOWING TESTS ON WELLS IN THE KEOKUK POOL, SEMINOLE COUNTY, OKLAHOMA

Subsurface pressure (Lbs. per sq. in.)	Pressure differential (Lbs. per sq. in.)	Rate of oil production (Bbls. per day)	Pressure differential (Bbls. per day)	Pressure differential* (Bbls. per day)	Pressure differential† (Bbls. per day)
WELL A					
December 1934					
1,734	0	....	....	....	....
1,653	81	252	3.11	28	0.346
1,507	227	516	2.27	34.3	0.152
1,335	399	768	1.93	38 6	0.096
1,190	544	982	1.8	42.1	0.077
1,079	655	1,125	1.72	43.9	0.067
August 1935					
1,609	0	0	....	....	....
1,576	33	160	4.85	27.8	0.842
1,535	74	253	2.88	29.4	0.336
1,420	189	462	2.44	33.6	0.1775
1,256	353	702	1 99	37.4	0.106
WELL B					
December 1934					
1,714	0	..	....	....	....
1,583	131	280	2.7	24.5	0 187
1,443	271	508	1.875	30.8	0.114
1,272	442	780	1.76	37.2	0.084
1,196	518	1,125	2.17	49.5	0.096
982	732	1,335	1.83	49.4	0.0675
August 1935					
1,605	0	0	....	....	....
1,521	84	265	3.16	28.9	0.344
1,381	224	420	1.875	28.2	0 126
1,231	374	720	1.93	37.3	0.100
1,120	485	850	1.76	38.7	0.0795

*One-half power. †Three halves power.

[1] Figures refer to bibliography.

(The statements and opinions expressed herein are those of the author, and should not be construed as an official action or opinion of the Institute.)

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is not a constant with rate of production. He defines two indices: one for reservoirs in hydraulic and volumetric control, and one for reservoirs in capillary control. For the first, dividing the rate by the square root of the pressure differential should yield a constant index; and for capillary control, dividing the rate by the three halves' power of the pressure differential should yield a constant index. The term "productivity index" as used in this paper means the rate divided by the pressure differential.

Bottom-Hole Pressure

Although bottom-hole pressure gauges have been in use for a number of years, they have only recently come into rather common usage, and much still must be learned concerning the technique of obtaining accurate bottom-hole pressure data. In determining the static bottom-hole pressure, it is not merely a matter of lowering the gauge into the well and obtaining a reading; it is a question of proper handling of the well prior to the measurement. For example, while one well may attain its maximum bottom-hole pressure after a four-hour shut-in period, another may require a 24-hour shut-in period; and these factors must be considered in the determination of the static or shut-in pressure. In obtaining the bottom-hole pressure at some rate of production, it is necessary to allow the well to flow at that rate for a sufficient period of time to allow the bottom-hole pressure to become stabilized; this again may require only a few hours in one well, whereas another well may require 10 or 20 hours.

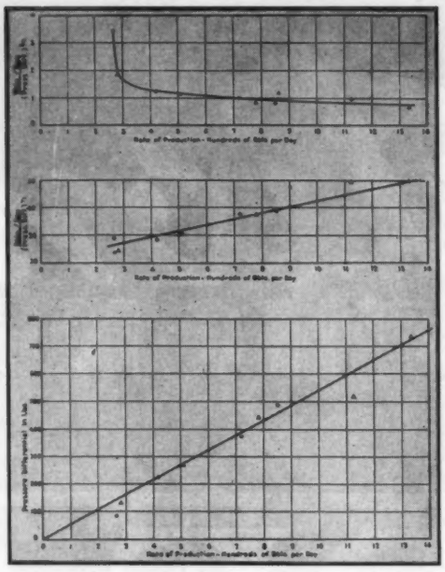

Fig. 2—Well B, Keokuk pool, Seminole County, Oklahoma

Well Gauging

Another factor which is very important in the determination of the productivity index is an accurate gauge of the well's production. Although the bottom-hole pressure differential plotted against rate of production may be a straight line, this is only true up to a certain per cent of the well's potential production—the per cent depending on the gas-oil ratio, bottom-hole flowing pressure, and other factors. Assume a well under study which is capable of producing only 400 bbls. per day, and the maximum rate at which it could be produced and stay within the straight-line range is 25 per cent of its potential. With accurate readings, it would be necessary to obtain only two bottom-hole pressures to establish the productivity index, the static pressure, and the flowing pressure at one rate. However, in order to minimize error, it is advisable to obtain flowing pressures at a number of rates; and it would, therefore, be necessary to produce the well illustrated above at several rates below 100 bbls. per day. The rate of 100 bbls. per day is equal approximately to 4.2 bbls. per hour. If the well is producing into a 500-bbl. tank where one-fourth inch is equal to

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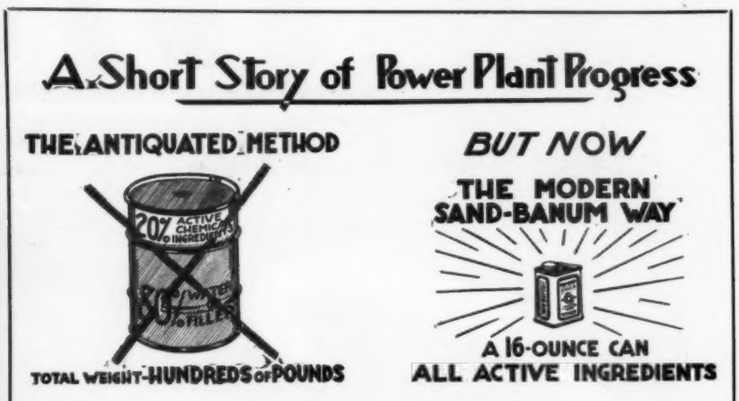
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TABLE 2—FLOWING TESTS ON WELLS IN THE LUCIEN POOL, NOBLE COUNTY, OKLAHOMA

Subsurface pressure (Lbs. per sq. in.)	Pressure differential (Lbs. per sq. in.)	Rate of oil production (Bbls. per day)	Pressure differential (Bbls. per day)	Pressure differential* (Bbls. per day)	Pressure differential† (Bbls. per day)
		WELL C			
1,825	0	0	0	....	.....
1,710	200	115	1.73	16.7	0.179
1,615	510	210	2.43	35.2	0.167
1,410	960	415	2.32	47.0	0.117
1,195	1,500	630	2.38	59.5	0.095
		WELL D			
1,800	0	0	....	....	.....
1,685	195	115	1.69	17.8	0.163
1,515	535	285	1.88	32.2	0.117
1,325	960	475	2.02	44.0	0.092
1,110	1,507	690	2.18	57.2	0.084
		WELL E			
1,845	0	0	0	....	.....
1,805	150	40	3.78	23.8	0.595
1,727	515	118	4.37	47.4	0.501
1,645	975	200	4.87	68.3	0.344
1,525	1,590	330	4.98	89.3	0.279

*One-half power. †Three halves power.

1.36 bbls., it is obvious that considerable error can be made in gauging the well's producing rate.

Well A

Table 1 gives data obtained on two wells in the Keokuk pool, in Seminole County, Oklahoma. The data for well A is shown graphically in Figure 1. It will be noted that the pressure differential is decidedly not a straight line. Two sets of data were obtain on each well: one during December, 1934, and one during August, 1935. Both sets of data are shown in the tabulation and on the graphs. It will be noted that the productivity index, as defined in this paper, is not a constant. However, it will also be noted that the productivity index as defined by Herold is not a constant.

Well B

The data for well B is shown in Figure 2. Here it will be noted that the relationship between the rate and pressure differential is a straight line passing through the origin, thus giving a constant productivity index with rate of production. Again it will be noted here that the productivity index as defined by Herold is not constant.

Wells C, D, and E

Table 2 gives data obtained on three wells in the Lucien pool, Noble County, Oklahoma. The data for well E is shown in Figure 3. Here again a straight line can be drawn through the pressure-differential points and the origin, resulting in a constant productivity index. As in the case of the wells in the Keokuk pool, the productivity index defined as the rate divided by the square root of the pressure differential increases with rate of production, and the productivity index defined as the rate divided by the three halves' power of the pressure differential decreases with rate of production.

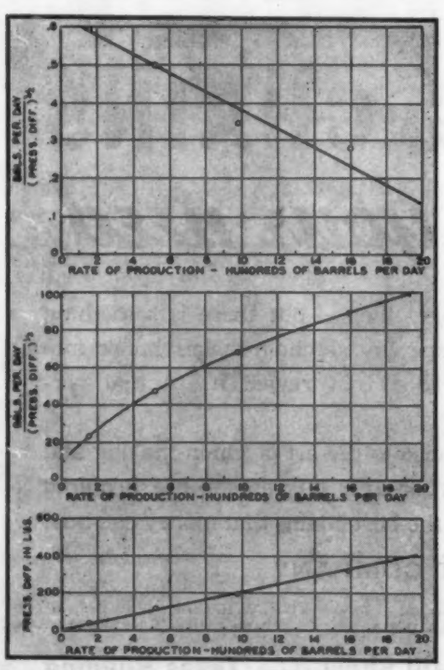
BBLS. PER DAY / (PRESS. DIFF.)½
RATE OF PRODUCTION - HUNDREDS OF BARRELS PER DAY
BBLS. PER DAY / (PRESS. DIFF.)³/²
RATE OF PRODUCTION - HUNDREDS OF BARRELS PER DAY
PRESS. DIFF. IN LBS.
RATE OF PRODUCTION - HUNDREDS OF BARRELS PER DAY

Fig. 3—Well E, Lucien pool, Noble County, Oklahoma

Other Wells Tested

Table 3 gives data obtained on three wells in the South Burbank pool, of Osage County, Oklahoma. The pressure differential plotted against rate of production is shown in Figure 4. It will be noted that the pressure differential is a straight-line function of the rate of production, thus yielding a constant productivity index. It will be noted that, at the higher rates of production, the straight-line relationship does not hold. However, this is of no particular concern, as it is at the lower rates that it is desired to establish the productivity index.

TABLE 3—FLOWING TESTS ON WELLS IN THE SOUTH BURBANK POOL, OSAGE COUNTY, OKLAHOMA

Subsurface pressure (Lbs. per sq. in.)	Pressure differential (Lbs. per sq. in.)	Rate of oil production (Bbls. per day)	Pressure differential (Bbls. per day)
		WELL F	
842	61	120	1.97
838	65	130	2.00
750	121	228	1.88
719	184	362	1.97
718	185	382	2.06
710	193	385	2.00
709	194	394	2.03
697	206	453	2.20
650	253	583	2.30
582	321	858	2.68
		WELL G	
748	118	107	0.91
705	161	160	0.99
652	214	196	0.92
566	300	288	0.96
494	372	407	1.09
461	405	450	1.11
420	446	539	1.21
		WELL H	
868	30	40.6	1.35
821	77	108	1.40
724	174	238	1.37
674	224	324	1.45
646	252	349	1.39
556	342	485	1.42
524	374	583	1.56

Some of the other data obtained on flowing tests, similar to those described above, have been of various types. For example, a number of tests conducted on wells in the Keokuk pool yielded increasing productivity indices with rate of production, while other wells in the same pool yielded decreasing indices. Still other wells yielded increasing, then decreasing indices, with rate of production. It does not seem plausible that such data are consistent. From a study of the data obtained so far, it would appear that the productivity index is a constant with rate of production; and that the decrepancies noted above are due to observational errors, either in gauging the production, or in determining the pressure, or both. In many instances, where the productivity index shows increasing or decreasing tendencies when calculated for each rate of production, a straight-line interpretation can be made of the pressure differential plotted against rate of production, indicating a constant value for the index.

Advantages of Productivity Index

The advantages of the productivity index over other potential tests are:

1. It is a better measure of the ability of the formation to yield oil.
2. It is not necessary to produce the well at high rates to establish the productivity index, thus eliminating the hazard of damaging the well due to premature water encroachment.
3. It eliminates the waste occasioned by open-flow potentials.
4. It eliminates expensive, over-size equipment.

Disadvantages

The disadvantages of the productivity index are:

1. It has not been definitely established that it is a constant with rate of production; and, therefore, some confusion exists as to just what is the productivity index.
2. Special equipment and trained men are necessary to establish it.
3. It is difficult to determine in wells which flow by heads, or are being produced by artificial means.

Conclusions

It is the writer's opinion that the use of productivity index has advantages that far outweigh the disadvantages. Much has been learned in the past year or two concerning the relationship between bottom-hole pressure and rate of production; and, with continued study, it seems almost certain that it will soon be entirely practical satisfactorily to determine the productivity index of a well, and to use such indices in the allocation of production. The productivity index is a measure of a well's relative ability to produce oil and, therefore, will not conflict with the laws of states requiring that the well's ability to produce be a factor in allocation. Such ability to produce need not be an open-flow potential.

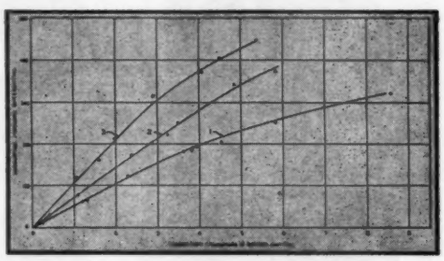

Fig. 4—1, Well F; 2, Well G; 3, Well H. South Burbank pool, Osage County, Oklahoma

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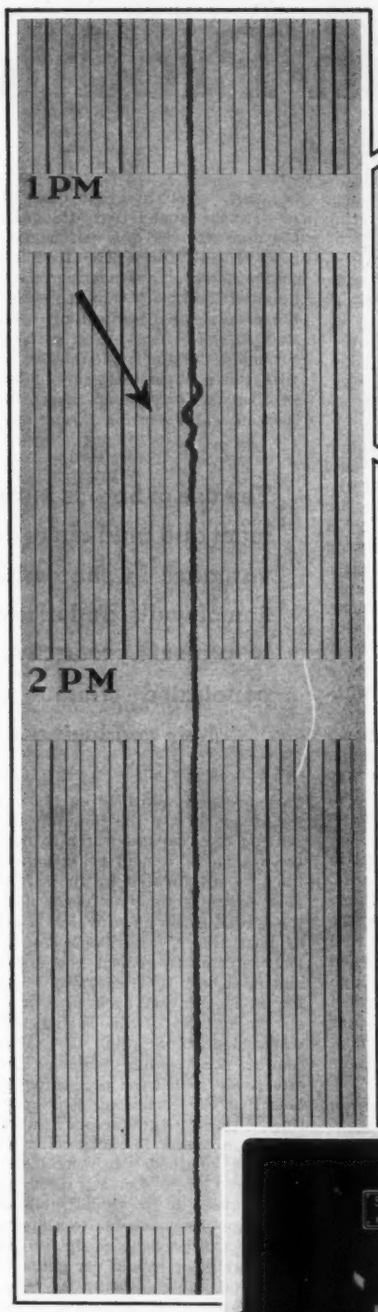
1. T. V. Moore, Proc. A.P.I. 11 (IV) 27 (1930).
2. Stanley Herold, Petroleum World 32 (6) 48 (1935).

Second Edition of Directory of Texas Manufacturers

The second edition of the Directory of Texas Manufacturers, published by the Bureau of Business Research, University of Texas, offering a comprehensive summary of the manufacturing industries located in Texas, has recently been published. This directory would be of great aid to refiners, natural gasoline manufacturers and most everyone associated with the oil industry, since it contains a complete list of refineries, natural gasoline plants, equipment manufacturers and all industries manufacturing materials such as sulfur, caustic soda, solvents, etc.

The first section of the directory lists the names of the manufacturers alphabetically under the towns. Opposite the name of the company is a symbol or letter indicating the distribution of the products manufactured. The subject headings are arranged alphabetically, listing under each subject the names of the manufacturers of the various products. The second section contains a classified list by products and covers as nearly as was possible all products reported by the manufacturers.

The directory, which costs $1, may be obtained from the Bureau of Business Research, University of Texas, Austin, Tex.



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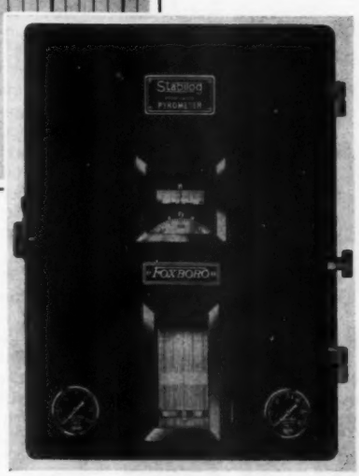

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Fibrous Materials in Cement and Mud Form New Field in Production

By *H. K. IHRIG*

The old adage "Necessity is the mother of invention" holds true with the recent development of the practice of using fibrous materials in cement for cementing oil well casing and in muds for rotary drilling in localities where the loss of circulation of drilling mud and cement slurry into highly porous or fissured formations is encountered.

The first stages of the development of the use of fibrous materials in cement and mud was in the Fitts pool, Oklahoma, where a two-fold drilling problem was present in the form of supercharged shallow sands which at times forced salt water into the drilling mud, while other formations did exactly the opposite by taking drilling fluid and cement slurry out of the hole. It was to combat this last problem that the use of fiber in muds while drilling and in cement for cementing came into use.

It was believed that the best manner of overcoming the loss of circulation while drilling and thereby removing one of the main causes of salt water inflow and also overcoming the loss of cement slurry into highly permeable formations, which would also overcome the escape of gas from shallow supercharged sands upward behind the casing, was to obtain an effective seal of those highly permeable, or so-called "thirsty" formations, as quickly as possible during the drilling operations.

This condition, along with the importance of properly drilling and cementing oil wells, grew in importance to such a degree that it became essential to create new methods and new materials to meet competition. This brought about a great deal of research and experimental work on fibrous material with cement and muds by several cement companies, distributors of mud conditioning compounds and oil well cementing companies.

These companies, through their laboratories, which are under the supervision of competent engineers, have established in the past year facts concerning the use of fibrous materials with cement and mud which indicate a new advancement in the oil industry from an economical operating standpoint.

This experimental work included: (1) Selection of various materials, as to kind, shape and size, that would be suitable for sealing; (2) samples of permeable formations ranging from fine sand up to a very coarse gravel; (3) mixtures of sealing materials and various drilling fluids; (4) mixtures of sealing materials and cement; (5) mixtures of sealing materials and oil; also, a number of other miscellaneous mixtures.

In mixing the sealing materials with drilling fluids, special attention was given to determine their effects upon the physical properties of the drilling fluid, such as viscosities, gelatination, weight, suspension, etc.; also their effect upon the pH value of the mud.

In mixing the sealing materials with cement, special attention was given to determine their effects on the physical properties of cement slurry, such as setting time, consistency, compressive strength, permeability, pH value, etc.

In addition to covering the effects of these sealing materials on the physical properties within the mud and cement, different mixtures were applied under pressure from a high-pressure pump into the face of a sample of permeable media. After each sealing test, the permeable media was examined for depth of penetration on the sealing material and the depth of the film built up on the surface of the media.

The first actual use of the sealing material in drilling fluids was on a well in the Fitts pool, Oklahoma, and results produced were both interesting and successful. One outstanding use of the fibrous sealing material in cement was on a well drilled in western Kansas. This well had drilled through a sand carrying salt water under high pressure. After the formation had been penetrated and drilling was in progress below it the salt water so contaminated the drilling fluid that the mud lost its effective head and the well started flowing salt water in great quantities. A string of pipe was run and two attempts made to cement the pipe and seal the salt water formation, using neat cement slurry. The first job was attempted using the regular cementing practices. Twenty-five hundred sacks of cement were used, but after the cement was pumped up behind the pipe the flow of water was so great that it carried the cement out of the hole. Another attempt was made with the neat cement slurry by using back pressure on the outside of the casing string and on the salt water bearing formation. When sufficient back pressure was held on the outside of the casing string to stop the flow of salt water, and permitting only enough water to escape to allow for the volume of cement being pumped into the hole, the pressure created by the salt water forced the neat cement into other permeable formations and the second cement job, which also used 2,500 sacks of neat slurry, was unsuccessful. The third and last attempt to cement the hole was successful, and used only 1,000 sacks of fibered cement. During this operation back pressure was again held on the outside of the casing string and enough water bled off to permit the placing of the fibered cement. The sealing material in the cement so effectively sealed the permeable formations in the hole that the cementing job was finished in good time with very satisfactory results. Only the 1,000 sacks were used, 75 sacks being left in the casing.

The use of fibrous material in cement and mud offers definite advantages in successful completion of wells, and also adequately protects productive horizons penetrated without damaging their producing ability.

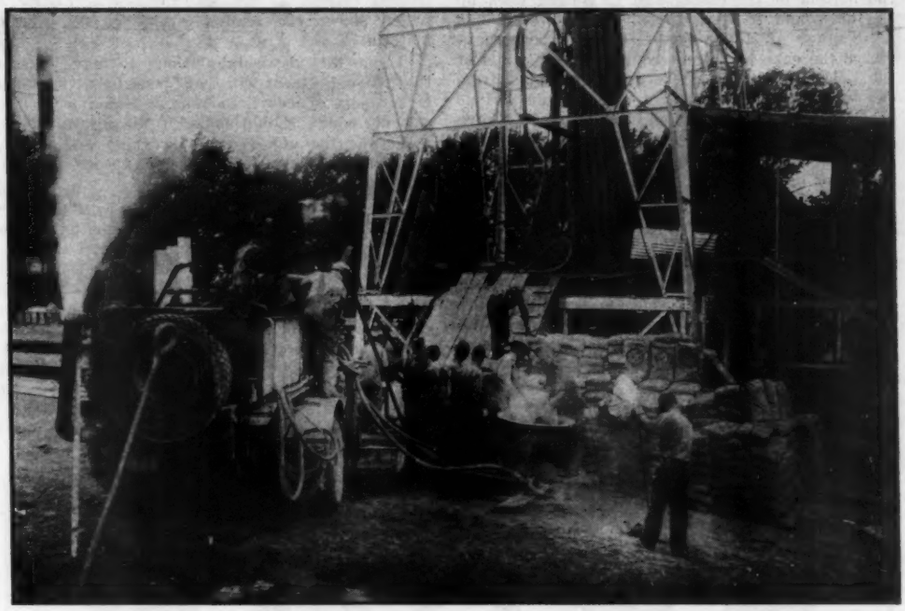
Tests conducted by engineers in the Dewey Portland Cement Co. laboratory showed that the fiber causes a very desirable decrease in the shrinkage of cement due to segregation. By the use of fiber with cement a slight decrease in the specific gravity or weight per gallon of cement slurry is noticed, which results in reducing the hydrostatic head on the formation below. It slightly reduces the setting time for a given water-cement ratio slurry.

In the cementing of casing, especially surface pipe or the water string, it is often desirable to pump enough cement into the well so that the annular space between the casing and the well bore is completely filled to the surface with cement. This practice is necessary in order that the operator can be sure that the casing is solidly cemented into the well, thereby forming a good anchorage for control gates so that the well may be shut in against the high pressures that are likely to be encountered, without danger of gas blowing out around the casing. Quite frequently a casing cementing job will require considerably more cement than the theoretical volume of the annular space between the casing and the well bore. This volume can be accurately measured by introducing a small amount of a very powerful dye, which in this particular operation is usually uranine dye, into the drilling fluid as it is pumped

Cementing truck and crew in action during cementing operations

d Mud Open

n Practices



Cementing 13⅜-inch casing in new Oklahoma City extension

into the well and then measuring the amount of mud pumped into the well before the dye appears in the mud coming from the hole. The fact that some wells take more cement to fill the annular space between the pipe and the wall of the hole is probably causd by cavities that are considerably larger in diameter than the well bore, but is usually caused by the loss of cement into porous formations. In cases such as this, and where no identifying dyes are used, often the cement delivered to a job is not sufficient to fill the annular space, or the cement will become unpumpable before a sufficient quantity can be put into the hole to fill it to the surface.

The tabulation in Figure 1 gives examples of where a good cement job of this type is possible with a minimum quantity of fibered cement slurry, whereas a considerably larger quantity of neat cement slurry was used in nearby wells in the same area.

Except in extreme cases of loss of cement, a few of which may be noted in Figure 1, the cost of the fibered cement necessary will be about the same as the cost of the larger quantity of neat cement. However a saving is made by the oil company because less expense is incurred in the field when a smaller amount of cement is used and/or it is necessary to complete filling the hole from outside the pipe.

In the manufacture of this "self-sealing" cement the fiber is premixed with cement at the mill and shipped in the regular manner. The cement contains 2 per cent by weight of fiber of various lengths up to one-half inch. As the object and advantage of fiber cement is to prevent the loss of cement slurries in the thirsty or porous formations and by sealing the voyages in the formation it builds up an impervious protection against loss of cement into such formations. The immediate result is the use of less cement and at the same time assures that the desired portion of the casing string will be protected by cement as none of the slurry escapes. This results in complete protection to the pipe and prohibits migration of gas, oil and water from one formation to another. The most important advantage in the use of fiber cement is the access it gives to oil and gas reserves. Frequently a neat cement slurry will penetrate the formation to such a degree that later when the well is plugged back and the reserves are uncovered, the oil and gas cannot be obtained in its full potential, because the neat cement had penetrated the formation. When fiber cement is used the porous formations are sealed off without allowing any of the neat cement to penetrate the formation.

Experience in getting cement returns to the surface with fibered cement and not being able to do so with neat cement indicate that fibered cement can be used with like benefits for the oil string, even though it is anticipated that the cement will only be put in the annular space a sufficient height to effectively seal the oil string from the water string. Fibered cement is especially desirable for cementing oil strings when the casing seat is below the top of the producing formation. As producing formations are porous, extreme precautions should be taken to prohibit their saturation with cement, rotary mud, or drill cuttings. A certain practice has recently come into prominence wherein the wells are drilled either through the pay sand, or as deep into it as the operators feel advisable, and the casing is cemented as near the bottom as possible. After the pipe is cemented and the hole cleaned to bottom the pipe is gun perforated into those sections of the pay sand the operators want open to production. This procedure calls for accurate measurement of the hole and perforating into those sections of the sand carrying the most oil, which, of course, is determined from core samples of the sand. This permits the operator to case off large volumes of high pressure gas, salt water and any streaks of cavey material that may be within the pay zone. It also permits what might be called producing a well with a "predetermined" gas to oil ratio. Should the well be perforated within a heavily saturated section of sand and not have sufficient gas to flow the well properly, a few holes through the pipe into that section of the sand carrying gas in larger quantities will permit flowing the well as desired. The same may be true with the oil section of the well. Casing a well through a producing sand also offers the feature that in plug-back jobs the operator has the assurance that he is plugging back in pipe and is relieved of a certain amount of uncertainty. All this practice of cementing pipe through a pay sand would prove to be unprofitable with any kind of cement other than the type carrying the fibrous sealing material, as the neat cement slurry would penetrate to the extent of sealing the sand, making it impossible to obtain the full productive value of that formation.

Figure 2 is data obtained from tests made on cement samples obtained during the actual cementing operations.

It may be noted from the above tabulation that the compressive strength of fibered cement ranges from 70 per cent to 90 per cent of that of neat portland cement of the same cement-water ratio. First this may appear detrimental to the use of fibered cement. However, samples of neat cement recovered from oil wells during cleaning out operations indicate that the cement in the bottom of the hole does not set as hard as it will in the laboratories. Samples of neat cement recovered from the bottom of the hole have a chalky, porous, mucky appearance, while samples of fibered cement secured in a like manner have been noted to have a well consolidated, consistent appearance and are without the porous texture evident in neat slurries. Fibered cement will set to a better quality cement and still retain its quality of elasticity or ability to withstand shock, while the neat slurry is known to become brittle and will crack under shock. This elasticity or ability to withstand shock and vibration of drilling tools without cracking is a most desirable feature in oil well cements.

An increasing amount of attention is being given to drilling fluids so they will properly condition the walls of the hole before the cementing job is started. This precaution will increase the quality of the cement job obtained and is of great importance. Most of this conditioning is done by the use of gel type muds which form a thin impervious cake on the walls of the hole which ordinarily would withstand the high hydrostatic pressure built up by the cement column during the cementing operations, but this cake may be removed by the scouring action of the cement which is traveling at a high velocity when coming out of

FIG. 1—TABLE SHOWING COMPARATIVE QUANTITIES OF PORTLAND AND FIBERED CEMENT

Pool—	Quantity neat cement normally used	Quantity fibered cement used	Casing string cemented
Fitts, Oklahoma	2,600	1,000	Water
Ness County, Kansas	2,500	1,000	Water
Oklahoma City	2,600	2,000	Water
Oklahoma City	350	300	Surface

FIG. 2—COMPARATIVE COMPRESSIVE STRENGTH

(Pounds per Square inch)

		Portland	Fibered	Per cent fibered is of portland
Sample taken from cement truck discharge; slurry weight 14.7 pounds per gallon	3 days	1,780	1,365	77
	5 days	2,220	1,775	80
Sample taken from circulation returns from well; slurry weight 14.1 pounds per gallon	3 days	800	710	89
	5 days	1,160	845	73
Dry volume, per cent		100	115	

FIG. 3—COMPARATIVE SEALING ABILITY OF PORTLAND AND FIBERED CEMENT

Type cement—	Water cement ratio	Size formation (ins.)	Penetration of cement into formation (ins.)	Time required for fluid seal	Pressure against seal (lbs.)	Leakage through seal
Portland	5.5	0.046-0.093	14	Immediate	*3,000	None
Portland	5.5	0.187-0.25	36	No seal	500–1,500	All fluid pumped
Fibered	5.5	0.187-0.25	2	Immediate	3,000	None
Fibered	5.5	0.375-0.5	8	2 minutes	3,000	1 pint
Fibered	6.5	0.375-0.5	6	Immediate	3,000	None
Fibered	6.5	0.75	17	2.5 minutes	3,000	1 quart
Fibered	6.5	1	36	No seal	Negligible	All fluid pumped

*Maximum pump pressure available.

the bottom of the casing and in coming back up the hole, and if neat cement slurry were being used a loss of slurry would occur in those areas where the cake had been scoured off the walls of the hole. Removal of these protective cakes from the walls of the well may also permit serious caves to start working which otherwise would have stood in good shape. Some companies now attempt to run a single string of pipe, cement same on bottom of pay and gun perforate through pipe and cement into various pay levels as necessity arises, instead of setting pipe on each likely looking pay sand. This practice requires more cement for the oil string and that longer columns of cement be placed behind the oil string, with higher hydrostatic pressures on the formation because of the weight of the unbalanced column of cement slurry versus mud, consequently there is a high cement velocity around the casing shoe with the scouring action incident thereto.

Among the series of tests made by engineers on the comparative sealing effect of portland and fibered cement is the information in Figure 3, which shows the sealing ability of the fibrous material.

From the above tabulations it may be seen that fibered cement will seal formations with much larger pore spaces than can be sealed with neat cement, which should make it ideally suited for the cementing of oil wells in which are encountered thirsty formations that will absorb considerable quantities of neat cement.

Fiber in cement gives a body to the slurry which helps to prevent the intermingling of the slurry with the mud in pumping around the pipe, thus preventing contamination of the cement, which with neat slurry is considerable. The addition of this sealing material to cement accelerates the slurry to a small degree, depending largely upon the water-cement ratios. This is due to absorption of water; cures cement due to fiber giving up water; has less shrinkage than neat cement, and it also is more elastic and can absorb shock in a better manner than neat cement. It has been noted that there is a loss of only about one half pound per gallon by weight in the fibered slurry due to contamination by drilling mud when pumped around the pipe.

The cost of fiber cement is comparable with patented cement, and due to its increase in volume and efficiency, its actual cost is less than that of neat cement. Even though fiber cement costs slightly more than ordinary portland cement, a saving shows in the finished job due to the fact that very little slurry is lost into the porous formations. This is supported by the fact that in Oklahoma City, where it was not realized cement slurries were lost into porous formations, a saving of 14 per cent in cement was noted in cementing 265 feet of surface pipe and a saving of 23 per cent in cement was found in cementing 2,000 feet of 13⅜-inch casing, by using the fibered cement.

One Mid-Continent operator has used in excess of 130,000 sacks of fibered cement without a failure, either from the standpoint of setting or establishing circulation where desired. This cement was used in Kansas, Oklahoma, Texas, New Mexico, Arkansas and Louisiana. In the last mentioned state certain fields are particularly dangerous from an operating standpoint with reference to cementing practices. Bottom hole temperatures are high and it has been necessary to cool all cementing water with great quantities of ice before pumping it down the hole in an attempt to retard the rapid initial set of the cement due to the high temperatures. Those jobs in the high temperature areas using the cement with the fibrous sealing material have had no failures and have used no ice for cooling. This may be attributed to the fact that the fiber carries considerable water and gives it up slowly to retard the initial set of the cement long enough to permit completion of the job.

Fibered cement is also proving its worth in plugging back old wells, as it will set properly and give production even though being in contact with salt water or oil. There are jobs on record where plugbacks were attempted with neat cement repeatedly and were failures, which when followed by fibered cement have been satisfactory.

Fiber in mud and water performs the same mechanical result as it does with cement. Drilling contractors who have used fiber to overcome loss of circulation express the opinion that it is much superior to cotton seed hulls, because the varied lengths of fiber cover a broader field; and they do not have a tendency to clog the rotary bit. With the use of fiber in rotary mud it is not necessary to pull the drill pipe wet to determine the location of leaks in drill pipe, as the fiber will plug the leaks in the pipe and can be easily detected when pulled. The stopping of leaks in drill pipe also prohibits the hole from being washed out, which often times causes serious fishing jobs. Fiber has been successfully used in stopping seepage in surface ponds and slush pits. When used in salt water ponds where seepage exists fiber will successfully stop the seepage and prohibit pollution of surface land and streams from that source.

The fibered cement is packed in the conventional multiwalled paper sacks containing the usual 94 pounds net. It is used the same as portland cement in oil well cementing, being easily handled by the oil well cementing equipment now in use in all oil fields. The cementing may be done by any competent, experienced workmen and the weight of the cement should not be less than 14½ to 15½ pounds per gallon for best results.

Globe to Move Offices

WICHITA, Kans., May 16.—General offices of the Globe Oil & Refining Co. will be moved from Blackwell, Okla., to Wichita June 1. The entire thirteenth floor of the Union National Bank Building will be occupied by the general offices and the sales department of the company, which is to be moved from the Brown Building where it has been located the past three years.

Globe refineries are located at McPherson, Kans.; Blackwell, Okla., and Lemont, Ill. The company is one of the nation's largest independent refineries. Its products are marketed through independent outlets only. The general offices of the Globe company have been in Blackwell since 1917. A total of about 60 persons will comprise the general staff.

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Propane De-asphalting and Dewaxing of Mid-Continent Residuum

By A. P. Anderson,* H. O. Forrest† and Lee Van Horn†

*Shell Petroleum Corp., Wood River, Ill. †The M. W. Kellogg Co., New York, N. Y.

Three years ago the propane dewaxing process was first brought to the attention of petroleum refiners by the paper of Bahlke, Giles and Adams[1a] presented at the May meeting of the American Petroleum Institute. That paper discussed the preliminary experimental work on the process, and the design and operation of the propane dewaxing plant of the Standard Oil Co. (Indiana) at Wood River, Ill. This original plant has been operated at and above capacity since that time, producing oils of —10° F. to —15 ° F. pour test, depending on the viscosity of the distillates processed.

During the interval, another plant of essentially the same type, with designed capacity of 1,750 bbls. per day, has been built and put into successful commercial operation by the Union Oil Co. at Oleum, Calif., for waxy California distillates.

***A.P.I.*—Presented Mid-Year meeting of American Petroleum Institute, Tulsa, May 15, 1936.**

It is the purpose of this paper to present the developments which led to the design of a plant for handling residual stock at the Shell Petroleum Corp.'s refinery at Wood River, Ill., together with a general description of the plant itself and a brief review of the operating results to date.

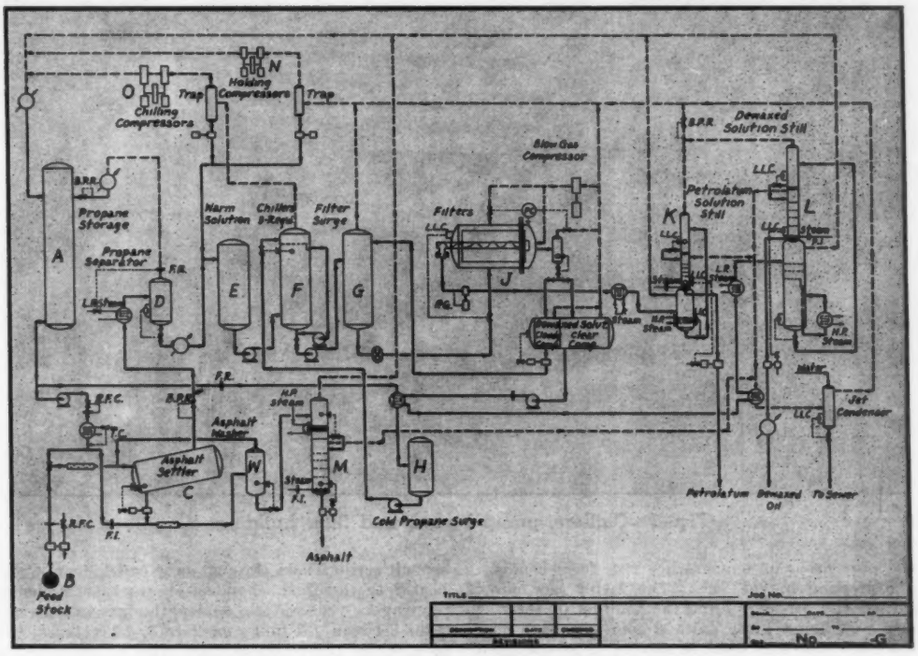

Fig. 1—Flow sheet of de-asphalting and dewaxing

New Developments

The two new developments which may be considered as largely responsible for the design of the Shell plant were continuous filtration and propane de-asphalting. Of course, the latter was not new in an experimental sense, but its application to commercial operation was new at the time this plant was conceived.

Continuous Filtration

In their paper Bahlke and his co-workers pointed out that: "Experiments being conducted at the present time indicate that a continuous process of filtration . . . can be readily developed to give results equally as good as, and probably better than, those described herein." They referred to a large amount of development work then being carried out by R. N. Giles and others at the Casper plant of the Standard Oil Co. (Indiana). The experiments were conducted on a 1-foot diameter Oliver drum-type filter installed in a pressure vessel, with propane vapor used as a means of maintaining the pressure differential.

Since the time that paper was presented, the development work has been continued and a great deal of effort was spent in working out all of the problems involved in the operation of this type of equipment. It was believed to be entirely justified because of the axoimatic advantages of continuous operation of any apparatus as compared with batch operation. The problems of maintaining the pressure differential with propane vapor without rise in temperature and removal of the wax cake were satisfactorily solved in the pilot plant, and a great many experiments were made on a variety of stocks to show that continuous filtration was very flexible in its application. As a result of this extensive work, it was concluded during 1934 that the continuous filtration process was ready for commercial application.

De-asphalting

During this same period extensive work was also being carried out on the de-asphalting of various residual stocks. As Bray[2] and others have pointed out, propane has the unique property of acting as an antisolvent for asphalt and heavier oils at temperatures only slightly above atmospheric (80° F. to 210° F.). It may be used, therefore, not only as a precipitant for wax at a low temperature, but also as a precipitant for asphaltic materials at a higher temperature. As shown by Wilson and Keith,[3] the quality of the heavy material precipitated may be varied from high-melting-point asphalt to lubricating fractions by adjustment of the temperature and propane ratio.

Although this paper deals primarily with the combination dewaxing and de-asphalting plant of the Shell Petroleum Corp., it should be pointed out that two other plants have been built and put into operation where de-asphalting is a major function. The 1,200-bbl.-per-day de-asphalting and acid-treating (in propane solution) plant of the Standard Oil Co., at Whiting, Ind., operates on a high-viscosity Mid-Continent residuum to produce cylinder-stock base by de-asphalting alone, or to produce bright-stock base by de-asphalting and acid treating. The 2,000-bbl.-per-day plant of the Texas Co., at Port Arthur, Tex., operates on a variety of stocks, including Mid-Continent residuum, and employs propane for de-asphalting only.

Shell Petroleum Corp. Plant—General Basis of Design

During the time these developments were being worked out, the Shell Petroleum Corp. became interested in the installation of a dewaxing plant at their Wood River refinery; and, as a result of their own research, decided upon the installation of a propane plant. Although the two previous plants had been built to dewax distillates and employed batch-pressure filters for the purpose, it was decided to use continuous filters for the new plant, because they have many advantages over the batch filters, particularly in ease of operation and in obtaining satisfactory drying and washing. The ability to watch the filter operating and make minor adjustments to obtain maximum capacity and maximum yield is especially useful. Of course, there were problems to overcome, but all concerned agreed that these could be surmounted. The two problems considered of major importance were: removal of wax from the filter shell, and

[1a] Figures refer to bibliography.

TABLE 1—INSPECTIONS OF CHARGE AND PRODUCTS

	Charge	De-asphalted oil	Dewaxed oil	Wax	Asphalt
Gravity, degrees A.P.I.	22.5	23.2	22.0	....	....
Gravity, specific	....	....	....	0.918	1.06
Pour point, A.S.T.M.	75	80	—10	....	....
Color, Tag-Robinson	....	5 D.D.*	8 D.D.*	....	....
Viscosity, Saybolt Universal, at 130° F.	598	493	642	....	....
Viscosity, Saybolt Universal, at 210° F.	106	94	105	72	....
Flashpoint, degrees F.	440	440	440	....	....
Melting point, degrees F.	....	....	....	137	....
Penetration (A.S.T.M.) at 77° F.	....	....	....	....	8
Softening point (A.S.T.M.) degrees F.	....	....	....	....	170

*Double-dilute; diluted 85:15 with water-white naphtha, and then diluted again in some manner.

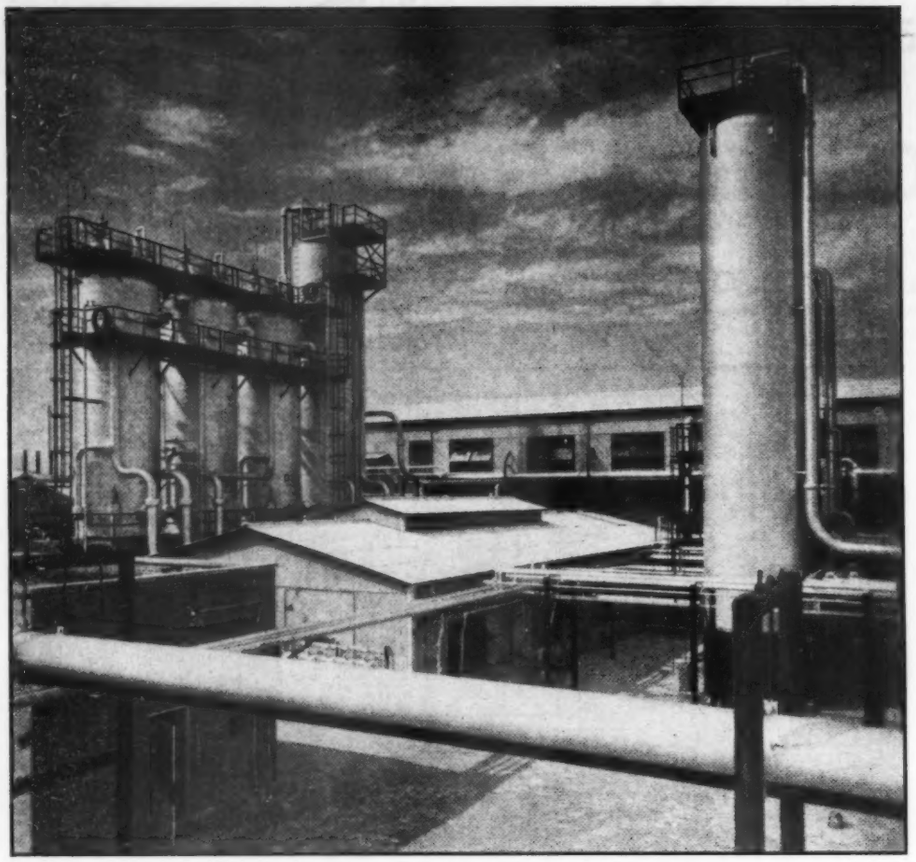

Fig. 2—Chillers, pump house, and filter building

the prevention of temperature rise from condensing propane in the shell. The latter has never caused any difficulty, and the solution of the former was found to be quite simple—although considerable time was spent in solving it, as discussed hereinafter.

The plant was designed to have a capacity of 2,450 bbls. per day of dewaxed oil, of sufficiently low pour test so that after subsequent solvent treating and distillation the pour and cloud tests would be satisfactory. These specifications are a very severe test for any dewaxing process; but preliminary experimental work had shown that all cuts would have pour tests of 0° F. or below, and that the cloud would be satisfactory. The charging stock was a long residuum corresponding to about 30 per cent of Mid-Continent crude. Approximately 3.5 per cent of 170- to 200° F. melting-point asphalt could be removed by precipitation with propane; and the plant was, therefore, designed to include a de-asphalting operation.

Description of Process

A detailed flow sheet of this plant is presented in Figure 1, including minor changes made since the plant was originally put into operation. The process consists of mixing the raw residuum with about 4 volumes of propane, allowing the apshalt to settle, and then removing about 2½ volumes of propane from the upper oil layer. The remaining solution is then chilled to —40° F. by self-evaporation—adding cold propane from the exchange system to maintain concentration, and then filtered to remove wax—and all products are subsequently de-propanized.

In more detail, the flow of materials through the plant is as follows:

Propane from the storage tank A is mixed with the residuum charge B in the ratio of four volumes to one; and the solution enters the asphalt settlers C where the asphalt, containing about one volume of propane, settles continuously by gravity. This fluid-asphalt solution may then be washed in the vessel W with a portion of the fresh propane, or the washer may be by-passed and the asphalt solution fed directly to the de-propanizing still M.

The de-asphalted solution from the top of the asphalt settler flows through an exhaust-steam preheater to the flash chamber D, where sufficient propane is removed to reduce the propane to a ratio between 1.5 to 1 and 2 to 1, by volume. It then enters the warm-solution tank E, after having been water-cooled to 100° F.; and this tank supplies surge capacity between the de-asphalting and dewaxing systems. From this tank the solution is pumped alternately to each of the three chillers F, and is there chilled by self-evaporation to —40° F.—the propane being compressed by the compressors O and returned through the condensers to the storage tank. Cold propane from the tank H is added to the chiller to replace the propane vaporized, and to bring the chilled solution ratio to 2 to 1. This cold propane is obtained by continuous exchange in a tubular unit against dewaxed solution which is preheated to about 70° F. The chilled solution is then transferred to the filter surge tank G, from which it is continuously pumped to the filters J.

Dewaxed solution is exchanged against the cold propane flowing to tank H, and is then pre-heated by the stripping steam and by exhaust steam before entering the still L. Here about 95 per cent of the propane is removed at high pressure, and goes directly to the condensers, while the remainder is flashed at atmospheric pressure and then stripped with steam. The wax solution is pumped through an exhaust steam pre-heater to a similar type of still K.

Description of Plant

A general view of the plant is shown in Figures 2 and 3. In both of these the tall tank in the foreground is the propane storage tank, and Figure 2 shows the switch house and pump house to the left of the propane storage with the three chillers and filter-surge tank at the extreme left. The compressor and filter building is in the rear. In Figure 3 the asphalt settler is in the center foreground, with the recovery system immediately behind it, and the exchanger and condenser tanks at the right. The warm-solution and cold-propane tanks are directly behind the propane storage tank.

The major parts of the plant, with the exception of the de-asphalting system and the filters themselves, are quite similar to the batch plants previously described; and it does not seem necessary to describe them in any detail. The de-asphalting system consists essentially of a mixing chamber and a settling tank, and the latter is merely a 10-foot by 20-foot horizontal tank with vertical baffles on 3-inch centers, having cross-flow through a manifold running the length of the tank. No difficulties have been experienced with the operation of this system, provided the still temperature is sufficiently high (300° F) to reduce viscosity and prevent foaming.

The filters themselves may be considered as the most novel part of this plant. Although the design of this filter has been presented before,[3] it is believed that more detailed discussion is pertinent at this time; and a line diagram showing the essential features of its construction is shown in Figure

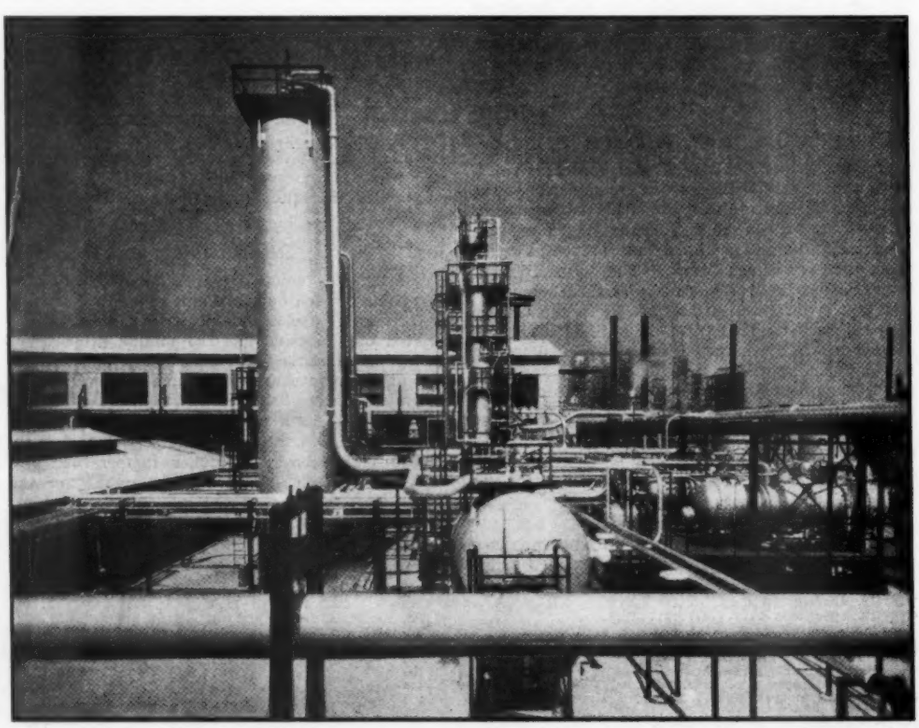

Fig. 3—Exchangers and recovery system

4. It consists essentially of a rotating sectionalized drum (Oliver-type) which is partially immersed in the propane-oil slurry. The pressure shell enclosing the drum acts also as the pan to hold the slurry. The drum rotates at a variable speed of 3 minutes to 11 minutes per revolution, and with a pressure differential across the drum of 2 to 10 pounds per square inch, with a normal value of about 4 pounds per square inch. Chilled slurry is fed into the shell, under control of a float in the filter to maintain a pre-determined level of 30 to 50 per cent submergence.

Figure 5 shows the general features of the filter assembly, with the connection to the master valve at the open end of one filter. The method of lifting the head and the carriage for receiving the drum when removed from the shell is also evident. Three observation ports just above the conveyor permit usual inspection of the operations at any time. The complete installation of six filters may be noted in this photograph. A rear view of the filter, showing various control instruments and the gas separator on the filtrate line, is presented in Figure 6. It may be noted that the solution recovered on the drying operation is included with the normal filtrate, because there is no increase in pour test in the material so recovered.

In the operation of the filter, the drum is rotated below the surface of the slurry, and the super-imposed pressure forms a wax cake due to the filtration of the solution. The drum then rotates through the vapor space where the cake is dried, and finally reaches the scraper where blow-back gas forces the cake from the cloth and onto the scraper blade. It then drops onto a screw conveyor, and passes to the suction of a gear pump. Spray nozzles for washing the cake with propane, or for washing the cloth with hot naphtha, are also shown in Figure 4, as well as the equipment for removing the drum for recovering or for any other purpose.

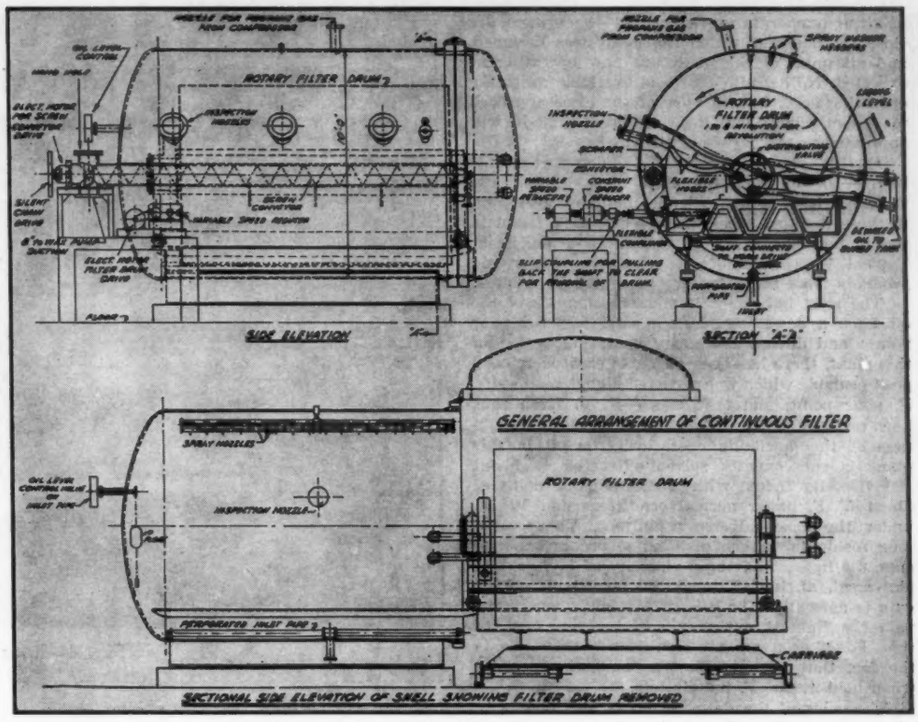

Fig. 4

Solution of Operating Problems

Particularly impressive is the fact that, from the first batch ever fed to the filters, no serious difficulty has been found with their operation up to the point of removal of cake from the pump. Cakes of about one-quarter inch are normal; and the formation, drying, and discharging from the drum are very simple operations. At infrequent intervals it is advisable to operate with the dry port partly closed, or with propane in the blow-back in order to improve operation. Such a procedure rapidly clears up any plugging which may occur, and resort to hot kerosine washing is seldom required. Wet blow-back may be used every few days, and hot washing may be required once a month. Even this is a simple procedure, and does not require heating the entire filter.

Wax Removal

Although the very first batch showed that temperature rise in the bowl was of little consequence, and that the filter would operate satisfactorily, it also demonstrated that the wax-removal problem was a serious one. Essentially, this was due to the dryness of the wax cake, which laboratory investigation showed contained much less oil and solvent than had been anticipated from batch-filter and experimental-filter operation. It was impossible to operate for more than an hour, and sometimes less, before the wax pumps would become useless. A number of different types of pumps was tried, some with more or less success, but none was satisfactory.

Laboratory investigations did show that the addition of enough propane to bring the ratio to 1½ to 1 on the wax cake would give a fluid slurry: and, since the wax-recovery system was designed on the basis of a larger amount of wax cake and a high propane ratio, it was adequate to handle this quantity. The slurry so formed was too low in viscosity for proper operation of the gear pumps, and a secondary piston-type booster pump was, therefore, installed in the line to the wax still, and was controlled to maintain a constant discharge pressure on the gear pumps of about 20 pounds per square inch.

In making this change, propane was fed to the conveyor trough; and the conveyor flights were cut so that it became a mixing device as well as a conveyor. This method of operation was started in the latter part of November, and since that time the plant has been operating continuously with no further difficulties of any kind in the operation of the filters. Filter rates as high as 3.5 gallons to 4.0 gallons of dewaxed oil per square foot (based on total filter area) have been maintained for several days.

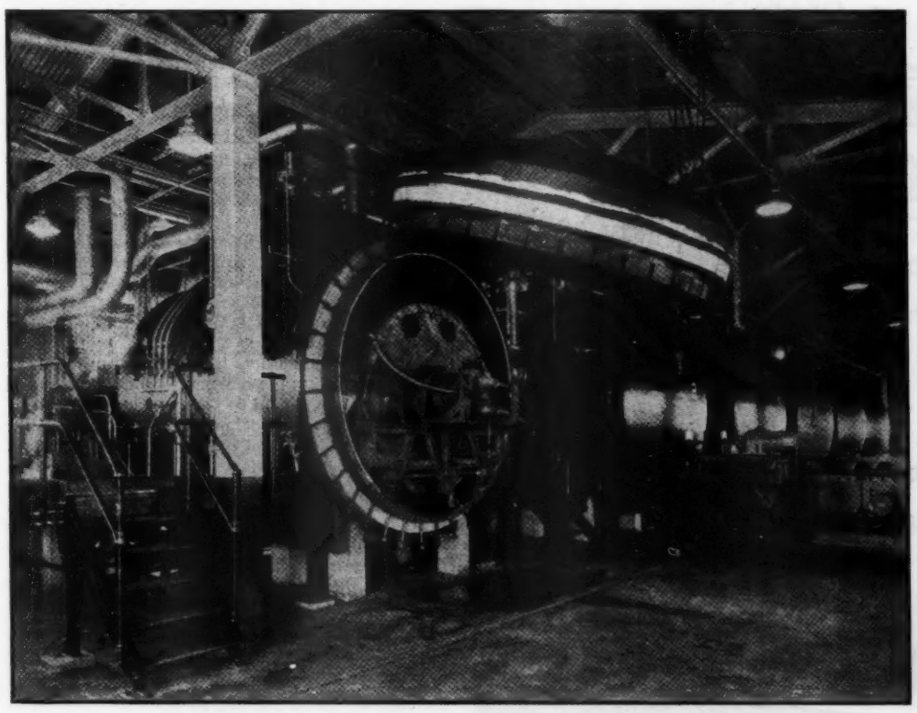

Fig. 5—View of filter assembly

Chilling

During the period from the latter part of November to April 1, the plant was operated at 60 to 70 per cent of capacity because of foaming difficulties in the chillers. Although the vapor velocities were thought to be adequately low at the time of design, it was later found that even lower velocities were required to prevent foaming. To correct this condition, it was necessary to install an additional trap and make slight adjustments in the chilling cycle. Since all low-temperature equipment (below 0° F.) is of nickel steel, there was some delay in obtaining material to make this change. It was made during the week of April 6, and the plant has now been operated at full capacity.

Operating Results

Capacity—The plant has been operating for a period of about six months, and during most of that time the capacity was approximately 60 per cent of design until the changes in the chilling system were made last month. Since that time it has been brought up to full capacity, although insufficient time has elapsed to present operating data at capacity. Only minor changes in operating conditions have been necessary in obtaining the design capacity, so that the general results of the six months of lower-rate operation can be considered typical of present conditions. The propane ratios

and the temperatures throughout the system are close to those for which the plant was designed, and all units of the plant are now operating as expected. No definite figure is available as to the operating cost; but, in view of the close approach to design conditions, it is believed that it will approximate the figure anticipated.

Quality—The pour point of the dewaxed oil has been —10° F. from the start of operation, and there has been no difficulty in this respect—except in those rare instances where leaks were found in the piping and welds of the filter drum itself. Typical inspections of the charging stocks and products from the plant are presented in Table 1.

The most important item in the quality of the oil from a dewaxing plant is obviously the pour point; and during the entire operating period of this plant, there has been only one eight-hour composite sample which was reported higher than —10° F. pour point, and that was —5° F. Even this, however, is not the only criterion of the thoroughness of the dewaxing operation. The oil in this plant is subsequently solvent-extracted to about 100 viscosity index, with a rise in pour point of about 5° F. under normal conditions and 10° F. under the most adverse conditions. The treated long residuum is then distilled to produce several cuts, the lightest having a viscosity of 110, Saybolt Universal, at 100° F., and the pour point of all cuts is normally 0 or —5° F. At infrequent intervals the lightest cut may show a pour test of +5° F. Of even greater significance than this is the fact that all cuts show no tendency to cloud when held at 20° F. indefinitely.

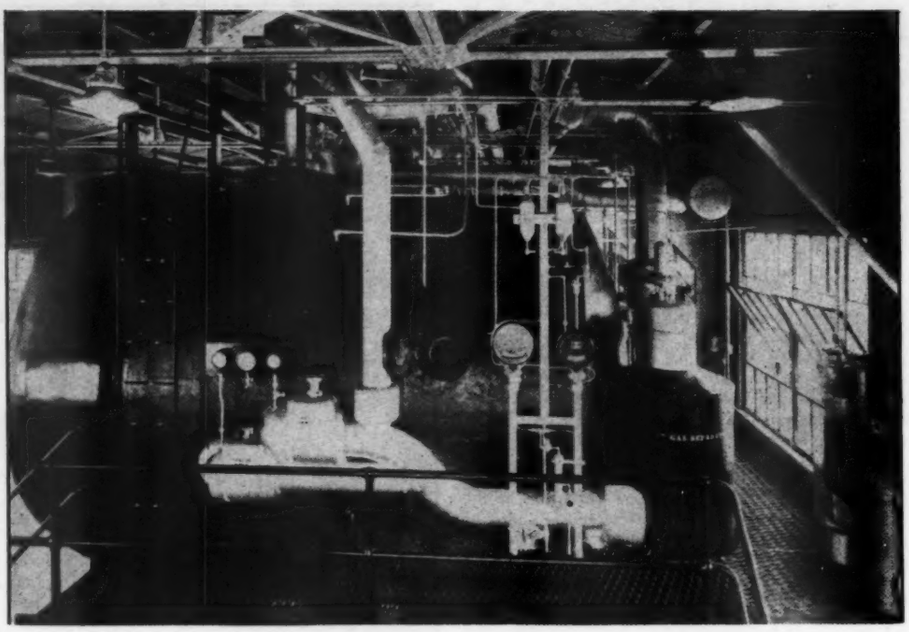

Fig. 6—Rear view of filter

The color of the dewaxed oil is also deserving of some attention. The dark residuum is de-asphalted to remove about 3.5 per cent of 170-melting-point asphalt, and then has a color of 5 D.D. Tag-Robinson. After dewaxing, the color has improved to 8 D.D., and the color is noticeably improved over that of the de-asphalted oil and the cast is very good. The concentration of color bodies in the wax may be noted from its very dark color.

Yields—Average-yield figures over long periods of time show 78.0 per cent dewaxed oil, 18.5 per cent wax, and 3.5 per cent asphalt. Based on de-asphalted oil, the dewaxing yield has been maintained at 81 per cent. For some consecutive days, yields as high as 85 per cent have been obtained, and it is anticipated that a yield of 83 per cent will be normal after the next few weeks of operation.

The wax produced has a melting point of 137° F.; and frequently shows an oil content, determined analytically, of less than 30 per cent. Although the plant was not designed for washing, some preliminary experiments have been made with sprays in the filter, which indicate that the oil content may be reduced easily to about 15 to 20 per cent by this simple method. As indicated above, some small amount of dark-colored semi-asphaltic bodies is removed in the dewaxing operation, so that it would be expected that the actual yield might be slightly lower than that calculated from the wax contents of the charge stock and the final wax cake. The actual yield over a long period of 81 per cent is 4 per cent higher than that used as a basis for the design of the plant.

Conclusions

The foregoing discussion has shown that a propane dewaxing plant has been in operation for about six months and has demonstrated two very important points: (1) that commercial continuous filtration in propane solution is entirely satisfactory; and (2) that it is possible, with propane, to dewax a Mid-Continent long residuum so thoroughly that the dewaxed oil may be solvent-treated and distilled to produce oils of satisfactory pour and cloud test.

Although the authors have been given the privilege of presenting the information on the operation of this plant, it should be pointed out that the solution of the two major problems was due to the cooperative spirit of all concerned with the project. Especially is acknowledgment due to the entire operating personnel of the Shell Petroleum Co. lubricating-oil department, and to J. T. Dickinson of the M. W. Kellogg Co., who was largely responsible for working out problems connected with filter operations, as well as other problems involved in the plant as a whole.

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Ten Years of Research

By GEORGE GRANGER BROWN
Professor of Chemical Engineering, University of Michigan

Rather than burdening you with additional technical data, this discussion reviews and summarizes the results which have been reported from year to year, with the object of showing the progress made in determining the proper use of natural gasoline in motor fuel, and the relation of these facts to past and present trends in the motor fuel and automotive industry.

Ten years ago at the fifth annual convention (May 6, 1926) preliminary results of tests on motor cars and their engines with standard factory adjustment led to the following three conclusions:

"With a cold manifold, or a manifold heated to a limited degree only, the best acceleration is obtained with the most volatile fuel.

"With a manifold exposed to the full heat of the exhaust, the best acceleration is obtained with a fuel having a volatility equivalent to that of a 15 to 30 per cent natural gasoline blend (with U. S. Motor grade).

"Natural gasoline blended up to about 50 per cent by volume in straightrun refinery Mid-Continent gasoline is about six-tenths as effective as an equal volume of benzol in supressing engine knock."

In those days of "benzol values," the knock rating of natural gasoline was higher than the current "Ethyl" gasoline standard (about 65 octane number, or 40 benzol value), and the high knock rating of natural gasoline was even more potent as a sales factor than is now the case.

At that same meeting it was suggested "that unblended natural gasoline seems to present all the properties needed for an ideal motor fuel, except that evaporation losses in storage and fuel tanks are excessive. Why not take all or part of the heat off the intake manifold, use cold air, lean carburetor adjustment and straight natural gasoline for fuel to avoid backfiring, obtain perfect acceleration and easy starting. The combined effect of a highly volatile fuel with cold air and cold manifold would eliminate knocking to a greater degree than is possible with heated air and manifold."

Figure 1 indicates the average 10, 50 and 90 per cent temperatures as reported by the Bureau of Mines survey from 1920 to 1930, and by R. C. Alden,[1] from 1930 to 1935. The approximate octane number of the house brand or competitive grade of gasoline has been estimated. The average mixture temperature of current models from 1931 to 1934 has been taken from Boyd, Campbell and Lovell,[2] and estimated for earlier years on the same basis from data taken over the past 10 years.

Since 1925, the average 90 per cent point has dropped 40° F. from about 385 to 345° F., the average 50 per cent point has dropped 40° F. from about 270 to 230° F., the average 10 per cent point from about 165° F. and the octane number about 48 to 50° F. Engine mixture temperature averaged about 130° F., depending upon conditions.

An extensive program was started in 1926 covering all phases of motor fuel volatility and the antiknock value of natural gasoline. The results were reported at numerous meetings and the effect of blending natural gasoline on the performance and knock rating was demonstrated by actual engine tests at the meeting of the Natural Petroleum Marketers Association in Atlantic City in the fall of 1926. In the report to the sixth annual convention,[3] the following conclusion was given as to the proper amount of natural gasoline to be blended with motor fuel.

N.G.A.A.—The research program of the Natural Gasoline Association of America has gained world-wide recognition and here its director summarizes the work as he presented the discussion before the annual meeting of the association in Tulsa.

"For reasonably constant engine performance without changes in adjustment, the amount of natural gasoline in the blend should be increased about 6 per cent for every 10° F. drop in atmospheric temperature.

At this time it was also recommended that not more than 50 per cent of natural gasoline should be contained in a blend with a material meeting the minimum specifications for U. S. Motor fuels, as there appeared little or no advantage in using a more volatile material than such a blend even in extremely cold weather with the motor equipment then available.

During 1927 these results were reported at five important meetings and an elaborate demonstration made at the West Baden meeting of the American Oil Men's Association, testing over 45 samples of motor fuel for antiknock value and effective volatility.

The following conclusions regarding vapor lock were reported to the seventh annual convention of the Natural Gasoline Association of America, 1928, page 45.

"Vapor lock in the carburetors of automobile engines has been carefully investigated and found to depend upon a number of important variables, most of which are largely due to design of the motor and of the fuel feed system. The work so far indicates that the tendency of a fuel to vapor lock may be fairly satisfactorily indicated by the temperature at which its gas free vapor pressure is equal to the atmospheric pressure under conditions of use."

Although not yet evident in the volatility characteristics of the motor fuel, refinery technologists were beginning to recognize the importance of low boiling front end at least in 1928. At this time the 10 per cent evaporated temperatures were declining steadily, and in the winter of 1928-29 the 50 per cent evaporated temperature began a decrease which is probably not yet completed.

At about this time the Phillips Petroleum Co. began marketing a high volatile motor fuel containing large percentages of natural gasoline and possessing volatility characteristics similar to those which had been recommended to the association in 1927.

In the report to the eighth annual convention of the Natural Gasoline Association in 1929, relationships were given in the form of charts for estimating the mixture temperature in the intake manifold of the motor as a function of atmospheric temperature and minutes after starting the car; and a chart relating the effective volatility of the fuel at different mixture temperatures from the A.S.T.M. distillation data; so that it was possible to estimate throttle response or engine performance directly from the A.S.T.M. distillation data, the atmospheric temperature, the time allowed for warming up the motor. These charts were presented in such a manner that the results could be applied to any probable carburetor adjustment or metering characteristics.

Vapor lock had been carefully studied and charts were

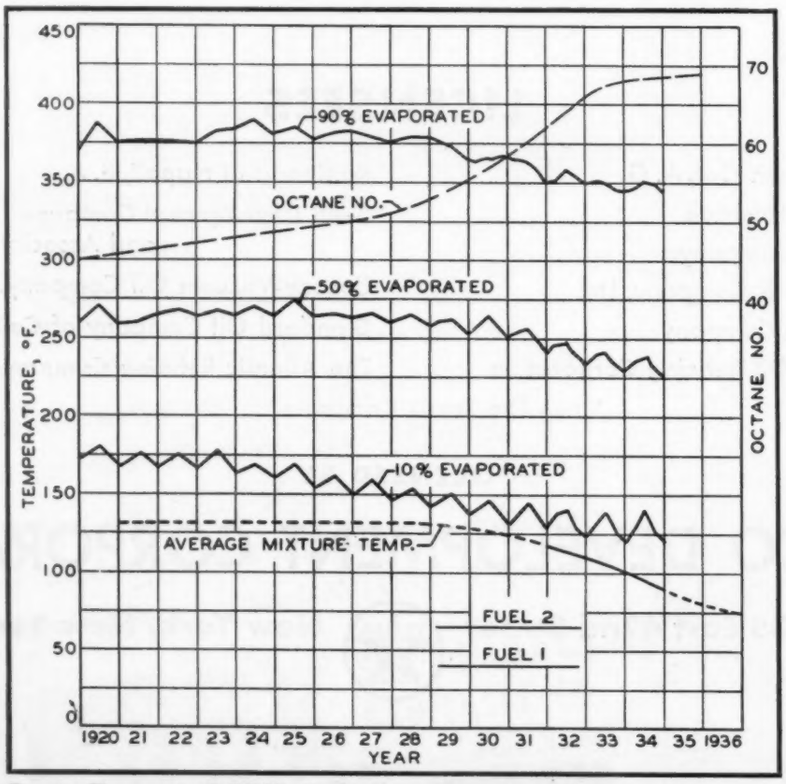

Fig. 1—Changes in A.S.T.M. distillation and octane number of motor fuel and in average mixture temperatures since 1920

[1]Proceedings of Natural Gasoline Association of America, Fourteenth Annual Convention, page 23, 1935.
[2]Proceedings Fourteenth Annual Convention, Natural Gasoline Association of America, page 40, 1935.
[3]Proceedings Sixth Annual Convention of the Association of Natural Gasoline Manufacturers, 1927, page 194.

Some Pipe Cleaning Records You Will Be Interested In!

Only eighteen months ago the first New Deal Pipe Cleaning Machine was placed on the market. Since that time these machines, in three models and several styles, containing many new, exclusive and important features have been introduced. During this period many leading Oil and Gas Companies, Utilities, Supply Companies and Pipe Yards in 14 states and abroad have adopted this equipment.

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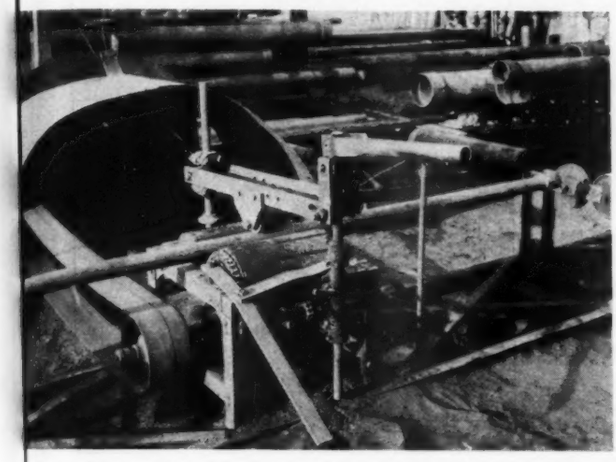

e of the first New Deal Pipe Cleaning Machines. Has cleaned over 1,000,-0 feet of pipe. Note scale and rust in foreground and under machine.

8 NEW DEAL Machines Cleaned 8,000,000 Ft. of Pipe and Still in Active Service . . . .

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Union Gas System, Inc.
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Northwestern Supply Company
Fort Smith Gas Company
K. C. Pipe & Supply Company
Victor Gasoline Company
LeFlore County Gas & Electric Company
Iverson Tool Company
Bradford Supply Company (3 machines)
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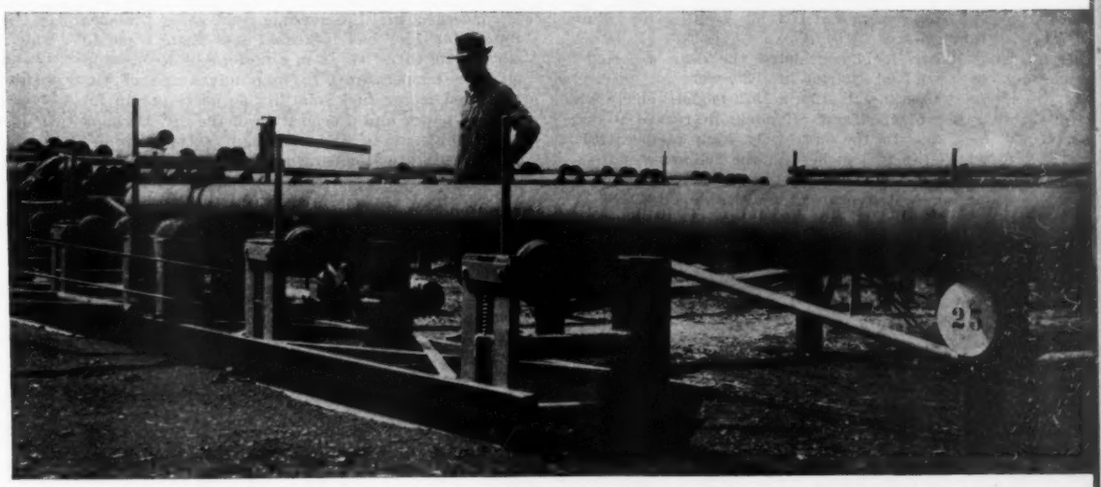
Thibodaux Boiler Works
Cities Service Gas Company
Wolfson Pipe & Supply Company
Berry Pipe & Supply Company
Kentucky Natural Gas Company
The Carter Oil Company



Field Photo of De Lux Model New Deal Pipe Cleaning Machine showing condition of pipe after cleaning.

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presented indicating the average maximum fuel line temperature in the fuel line or in the carburetor for different driving conditions for atmospheric temperatures varying from —20 to 100° F.; and giving the relationship between maximum fuel temperature and Reid vapor pressure at 100° F. which would give borderline vapor lock, and which would give definite trouble due to vapor lock; so that the safe permissible Reid vapor pressure determined at 100° F. could be readily estimated for any atmospheric temperature and operating conditions of the car then in use.

Based on maximum fuel line temperature for the vacuum-tank feed-system then in use, and for the pressure-feed system investigated at that time, the recommended permissible Reid vapor pressures make an interesting comparison with those subsequently recommended by Bridgeman in the proceedings of the twelfth annual convention, Natural Gas Association, 1933, and Boyd[4] and the section

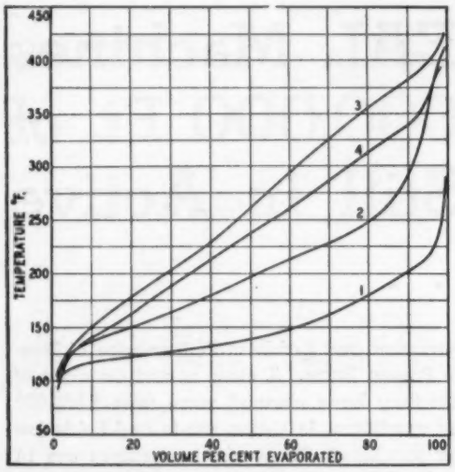

Fig. 2—A.S.T.M. distillation of fuels used

on Vapor Lock of Technical Committee "A" of A.S.T.M. Committee D-2[5] as given in the following tabulation.

When it is considered the data reported for pressure-feed systems in 1929, were for an electric fuel pump installed on a 1922 model Lincoln which is one of the forst offenders in regard to vapor lock due to the extremely high temperature to which the fuel is heated, the following statement from the 1929 report to the Natural Gasoline Association still appears a reasonable objective.

"With the combination of improved design of fuel systems, or plumbing as we may popularly call it, and the use of pressure feed, we may expect to use satisfactorily fuels of 12-pound Reid vapor pressure under most normal weather conditions, and as high as 15-pound vapor pressure in cold weather."

In fact 14-pound vapor pressure is common in Michigan during the cold months of the past two winters.

Due to a combination of education, and demonstration by the actual marketing of fuels of high volatility, the refiners began to increase the volatility of their motor fuels in earnest in 1929. In this year the average 90 per cent point dropped 15° F. after remaining substantially constant for the past eight years since 1920.

The work relating to motor fuel characteristics to engine performance based on the current motor design without change in manifold heating or in adjustment, was completed and reported in the form of a 300-page bulletin in 1930.

[4]Proceedings, thirty-seventh annual meeting, American Society for Testing Materials, Volume 34, Part 2, page 546 (1934).

[5]G. G. Brown, Proceedings A.S.T.M. thirty-seventh annual meeting, Volume 34, Part 2, page 555 (1934).

TABLE 1—RECOMMENDED MAXIMUM PERMISSIBLE REID VAPOR PRESSURE AT 100°F. BASED ON FUEL LINE TEMPERATURES

Atm. temp. °F.	N.G.A. (1929) Vacuum tank	N.G.A. (1929) Pres. feed	Bridgeman Best cars (1931)	Bridgeman Majority of cars (1933)	Boyd (1934)	Vapor lock section Tech. Com. "A" A.S.T.M. D-2 (1934)
100	7.0	10.0	11.4	8	..	8
95	7.5	10.5	12.3	..	8	..
85	8.2	11.0	14.6	10	..	10
80	8.5	11.5	15.9	..	10	..
75	9.0	12.0	17.3	11.6	..	12
65	10 0	16.0	20.3	..	12	..
50	13.0	....	....	..	..	..

TABLE 2—PROPERTIES OF FUELS USED

	Blend No. 1	Blend No. 2	Blend No. 3	Fuel No. 4
10% evaporated (°F.)	117	137	157	140
50% evaporated (°F.)	138	198	280	237
90% evaporated (°F.)	201	290	382	338
A.P.I. gravity (°)	78.1	66.1	65.1	61
Volatility No.	146	86	24	47
Octane number	65.9	65	65.6	69.4
Lbs./gal.	5.619	5.961	5.991	6.119
Reid vapor pressure at 100°F. (lbs.)	10.5	7.15	7.05	...

TABLE 3—DIMENSIONS OF METERING PINS AND CORRESPONDING CODE LETTER USED

(Orifice diameter 0.089 inch)

Code letter	Diameter at large end	Diameter at small end of taper	Diameter of step
A	0.065	0.055	0.046
B	0.067	0.057	0.048
C	0.068	0.058	0.048
D	0 069	0.060	0.048
E	0.067	0.060	0.052
F	0.068	0.058	0.053
X	0.064	0.054	0.044

Code letter for accelerating pump strokes

S—Short stroke.
I—Intermediate stroke.
L—Long stroke.
N—No stroke (pump disconnected and fastened in position).

Financial support was then given to a further investigation of vapor lock on the part of the Bureau of Standards, which resulted in Doctor Bridgeman's recommendation given before the association in 1933 as included in Table 1.

Although there has been little improvement in motor cars in so far as freedom from vapor lock is concerned, and the average Reid vapor pressure for motor fuel has increased less than 1 pound since 1929, there has been a noticeable decrease in mixture temperatures to take advantage of the increased motor fuel volatility so as to obtain increased power and acceleration of the car. Perhaps the willingness of the car manufacturer to decrease mixture temperature, and his apparent lethargy in decreasing fuel line temperatures, may be explained at least in part, by the increased power and performance obtained from lower mixture temperatures, while no such gain is obtained by an improvement in feed systems which permits a higher vapor pressure.

In any case the trend toward more volatile fuels and lower mixture temperatures clearly evident in Figure 1 from the years 1929 to 1934, led to a laboratory investigation as to the improved performance that might be obtained by using fuels of high total volatility and correspondingly low mixture temperatures. The results from the preliminary laboratory work were reported at the thirteenth annual convention (Proceedings, N.G.A.A., 1934, page 82), and indicated that a decrease of 5° F. in the middle range of the A.S.T.M. distillation would allow for equal throttle response with a drop in the mixture temperature of about 3° F.

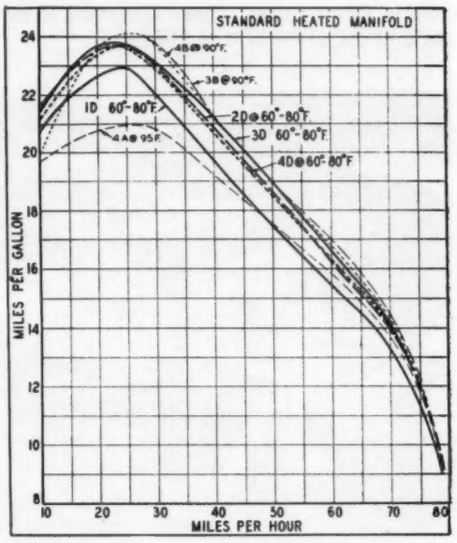

Fig. 3—Miles per gallon obtained with improved carburetor adjustments under constant speed, level-highway operation

which would increase the power output by an amount approximately equal to that produced by an increase in compression ratio permitted by an increase of one octane number in the fuel.

If we define the volatility index as equal to 284 minus the temperature of the 50 per cent point as has been proposed by Oberfell and Alden, the results of this laboratory investigation would indicate that an increase in four or five volatility numbers has as much potential increase in power under constant speed operation as one octane number.

In order to obtain this increased power from the more volatile fuel, it is of course, necessary to change the adjustments or design of the intake manifold so as to decrease the temperature of the mixture. Similarly a change in adjustments or increase in compression ratio is necessary to obtain the increased power that is potentially available in the fuel of increased octane number.

These results were found to be in agreement with similar tests reported by MacCoull.[6]

In the latter part of 1934 a second program at the University of Michigan was sponsored by the association to find out by means of actual road tests how much advantage could actually be obtained by the use of fuels of high total volatility in cars designed or adjusted particularly for such fuels.

This program was just well under way at the time of the meeting last year (May, 1935) but had progressed sufficiently to report significant data at the fall meeting of the American Petroleum Institute in Los Angeles, 1935. The equipment used and the

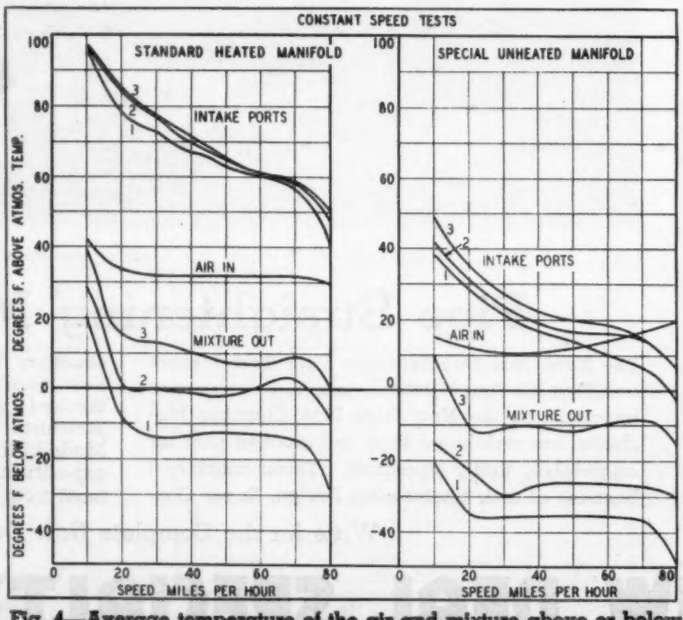

Fig. 4—Average temperature of the air and mixture above or below atmospheric temperature, plotted as a function of speed for the constant-speed tests with standard and special unheated manifolds

[6]MacCoull, S.A.E. Journal, Volume 32, No. 5, page 363, for November, 1932.

Here's an Ideal application for an S&J Flame Arrester

This illustration shows the assembled view of the S. & J. all-aluminum flame arrester, and details of the removable and renewable aluminum tube bank. Light in weight and resistant to corrosive gases, this flame arrester stands head and shoulders above similar devices in the excellence of design, material and fine workmanship.

The S. & J. Flame Arrester, pictured at the right, finds one of its most important applications in protecting the inter-connected tankage of a vapor recovery system. When installed in connection with an S. & J. breather valve and explosion relief valve as shown below, the S. & J. Flame Arrester provides a positive fire stop that prevents flame from one tank entering a connected tank.

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The S. & J. Flame Arrester is but one unit of a complete line of S. & J. gas tight fittings comprising the S. & J. Gas Recovery System. The flame arrester, like all other S. & J. storage tank equipment, bears the characteristics of high quality in materials and in manufacture. Made of aluminum, the S. & J. Flame Arrester is approximately one-third lighter in weight than comparable cast iron flame arresters, and its resistance to corrosion is far greater.

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methods of testing have already been described and only the significant results will be presented at this time.

The A.S.T.M. distillation of the fuels used in these tests are shown in Figure 2. The other properties are summarized in Table 2.

Table 3 gives the dimensions of the metering pins and the corresponding code letter used to indicate the pin used in the various test data reported. The code letter used for indicating the adjustment of the accelerating pump is also shown in Table 3.

Figure 3 indicates the miles per gallon obtained under constant speed operation with a standard heated manifold and with all thermostatic controls set according to factory adjustments, when using the different fuels as indicated. The lowest line indicating the smallest number of miles per gallon was obtained with the standard factory carburetor adjustment using metering pin "A." This curve is marked 4 A at 95° F. indicating fuel 4, carburetor adjustment with metering pin A at an atmospheric temperature of 95° F.

The most significant data in Figure 3 are given by the four heavy lines marked 3 D, 4 D, 2 D, and 1 D, 60°80° F. and indicate the miles per gallon obtained with a constant carburetor adjustment using metering pin D at atmospheric temperatures of 60 to 80° F. and each of the four fuels given in Figure 2.

In another series of tests using metering pin B and fuels 4 and 3 at 90° F. slightly greater maximum mileage at 27 miles per hour was obtained with a corresponding decrease in mileage to 10 miles per hour.

All of these tests were run with the spark set at zero reading on the octane selector which corresponds to a fuel of about 65 octane number.

Under these operating conditions, the mixture is sufficiently hot so that there is no appreciable gain in distribution due to the use of any of the more volatile fuels. For this reason the miles per gallon obtained from a fuel when used with the proper carburetor adjustment, should be almost directly proportional to the density of the fuel, since these fuels are all straight hydrocarbon fuels and have a heating value per gallon which is approximately proportional to their density. The average mileage obtained throughout the entire speed range is given in Table 4.

Similar tests with the special unheated manifold have not yet been completed but indications are that the results will be somewhat similar.

TABLE 4—AVERAGE MILEAGE OBTAINED AT CONSTANT SPEEDS FROM 10 TO 75 MILES PER HOUR

Standard heated manifold
Atmospheric temperature 60°—85° F.
Octane selector 0 equivalent to 65 octane number.
(All carburetor adjustment—D)

Fuel	Octane number	Volatility number	Relative mileage	Relative density
3	65.6	24	1.00	1 00
4	69 4	47	0.985	1.0215
2	65.0	86	0 994	0 995
1	65 .9	146	0 946	0 9377

Figure 4 indicates the average temperature at different points in the induction system when operating at a constant speed along a level highway with the standard heated manifold and with the special unheated manifold. When operating with the unheated manifold the thermostat is also removed from the water cooling system so as to give the best possible circulation of cooling water. Although the rise in temperature of the intake ports above atmospheric is slightly more in cold weather than in warm weather, the difference is negligible as compared with the differences observed on different days with varying wind conditions. For this reason the temperatures have been plotted as the number of degrees Fahrenheit above or below atmospheric temperatures.

Referring to Figure 4 it is clear that the temperature of the air entering the carburetor averages about 15 to 20° F. lower with the unheated manifold, due in a large measure to the fact that the hood was left off during the test with the unheated manifold. The temperature of the mixture out of the carburetor is approximately the same number of degrees below the air entering the carburetor whether the manifold is needed or not. This is to be expected as the drop in

temperature as the air passes through the carburetor is due almost entirely to the quantity of fuel vaporized therein. The different temperatures for the mixture out of the carburetor obtained with the different fuels is due to the different volatilities of the fuels. A drop in temperature of 45 to 50° F. indicates that the fuel is almost completely vaporized in the carburetor when a mixture of normal proportions is being used. A larger drop in temperature is found when a richer mixture is supplied as is indicated from about 75 to 80 miles per hour under which conditions the the carburetor is supplying an enriched mixture because the step on the end of the metering pin comes into operation when the throttle is fully opened.

Because of the lower air temperature, and the absence of heat supplied to the manifold by a hot spot, the temperature of the mixture entering the ports of the cylinder block averages about 50° F. lower when using the special unheated manifold

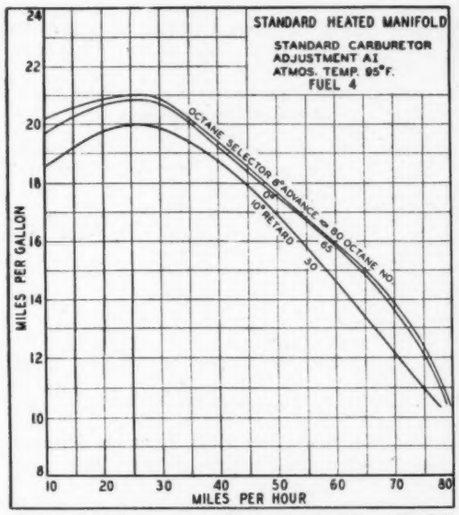


Fig. 5—Miles per gallon obtained with different settings of the octane selector as a function of speed for constant-speed, level-highway operation

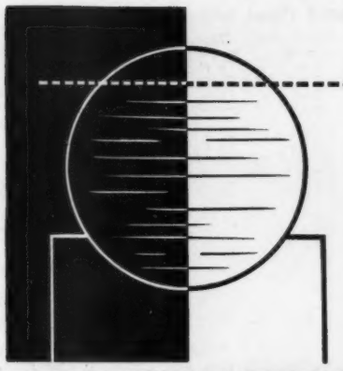
than with the standard factory equipment. Due to the greater volatility of fuel 1, the temperature of the mixture at the intake port is lower when using this fuel than when running on the less volatile fuels. Thus the most volatile fuel has the desired characteristics to give the best results with the unheated manifold. This is clearly indicated in Table 5 which gives the results of the maximum speed tests run with the different fuels and the different adjustments. The best results both as to top speed, and mileage at top speed are obtained with the most volatile fuel and the unheated manifold.

Comparing the data of Table 5 with those of Table 4, indicates that at top speed maximum power and mileage is obtained with the most volatile fuel, but that at constant speed part throttle operation volatility in itself has little effect on mileage which appears to depend directly upon the heating value of the fuel on a volume basis, or the number of energy units contained in 1 gallon.

Acceleration is a measure of maximum power at low speeds and has been determined for a wide range of carburetor adjustments and operating conditions.

It was found that different carburetor adjustments have more effect on the acceleration at different initial speeds, than upon the average acceleration obtained over a range of initial speed. For this reason the average acceleration obtained at initial speeds of 5, 15 and 25 miles per hour have been used as the significant acceleration in indicating the effect of fuel and manifold condition on car operation. In this work we are concerned with differences due to fuels and manifold temperatures, and not the vagaries of the various metering pins used in the carburetor.

Table 6 indicates the data obtained in the ac-



HOLD *those* LEVELS!

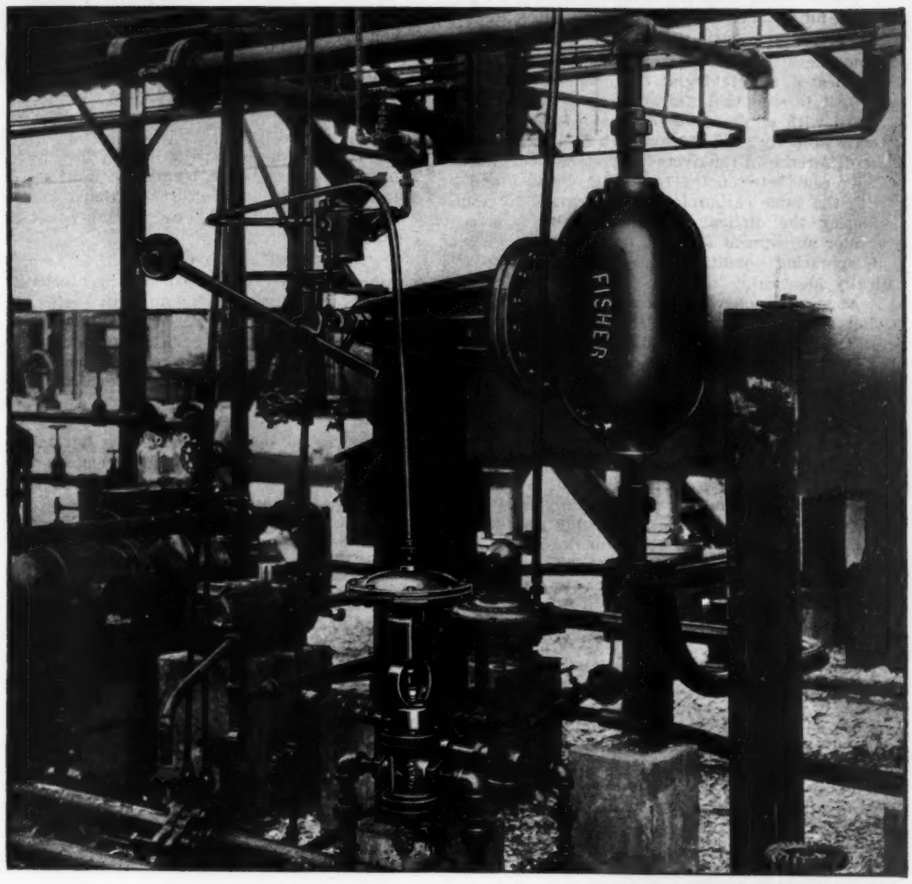


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TABLE 5—MAXIMUM SPEED TESTS RUN WITH DIFFERENT FUELS AND ADJUSTMENTS

Manifold—	Atmos. temp. °F.	Hood	Fuel	Octane selector	Mileage	Top speed	Rel. top speed	Relative power
Heated	95	On	4 A	A 4	9 4	79.75	1.0045	.0165
Heated	95	On	4 A	0	9 4	79 4	1.00	1.00
Heated	95	On	4 A	R 4	9.45	79 0	.995	.9835
Heated	95	On	4 A	R 10	9.33	78.15	.984	.945
Heated	90	On	4 B	0	9.44	79 5	....	....
Heated	90	On	3 B	0	9.65	79.1	....	....
Heated	60–80	On	4 D	0	8 8	79.8	....	....
Heated	60–80	On	3 D	0	9 3	79.1	....	....
Heated	60–80	On	2 D	0	9.1	79.1	....	....
Heated	60–80	On	1 D	0	9.0	79.2	....	....
Heated	43	On	3 A	0	9 5	79.8	....	....
Heated	20	On	3 A	0	9 4	79.75	....	....
Heated	44	Off	3 A	0	9.13	78.4	1.00	1.00
Cold	63	Off	3 A	0	9 6	80.0	1.02	1 07
Cold	60	Off	1 A	0	9 18	80 0	1 02	1 07
Cold	60	Off	1 E	0	10.2	80.25	1.0235	1 08

celeration tests with the different fuels and different adjustments.

Referring to Table 6 and the tests made at atmospheric temperature of 85° F. with a standard heated manifold and the octane selector set at 0, it is seen that the same acceleration is obtained with all fuels tested provided the carburetor is properly adjusted for each fuel. The greatest difference in the average acceleration is about 1 per cent between the tests with Fuels 1 and 2 with the same carburetor adjustment, E N. Considering the difficulty of getting the best carburetor adjustment for each fuel and for each set of operating conditions these results are practically identical.

At an atmospheric temperature of 50° F. somewhat richer carburetor adjustments are required for the best acceleration, and an increase in the accelerating charge indicated by using a longer stroke on the accelerating pump, appeared to give better results. The average accelerations obtained at 50° F. are somewhat better than those obtained at 85° F., due to the lower mixture temperatures at the lower atmospheric temperatures.

At an atmospheric temperature of 40° F. it was impossible to maintain the same standard of acceleration using Fuel 3. The results were about 15 per cent poorer than those obtained with the same fuel and carburetor adjustment at 50° F., or with the more volatile fuels at the same temperatures.

The data obtained with the standard heated manifold at an atmospheric temperature of 20° F. were taken with the octane selector retarded two points from the zero setting or equivalent to a fuel of 61 octane number. This retarded spark makes a difference in the acceleration of less than 2 per cent as indicated in Table 7. Under these conditions the standard factory adjustment A I with Fuel 2 gave the same acceleration as was obtained with this fuel at higher atmospheric temperatures and with the spark advanced to correspond to a fuel of 65 octane number. Using Fuel 3 with carburetor adjustment A I the results are about 30 per cent inferior to the general standard. By increasing the accelerating charge by the use of the long stroke on the pump, adjustment A L, performance is somewhat improved to about 20 per cent below standard. The numbers indicated in parentheses following the accelerations recorded for Fuel 3, adjustment A L, are the average number of backfires observed in each acceleration test and indicate the unsatisfactory performance obtained with this fuel at low atmospheric temperatures even with proper carburetor adjustments and heated manifold conditions. Using the standard factory adjustment A I with Fuel 1, the acceleration was found to be about 6 per cent better than standard even with the retarded spark. When corrections are made for the proper spark setting as given in Table 8 the acceleration obtained with Fuel 2 is equal to the best obtained at any higher temperature; that obtained with Fuel 1 is approximately 7 per cent better.

Using the special unheated manifold at an atmospheric temperature of 60° F. the acceleration obtained with Fuel 1 was approximately 3 per cent better than that obtained with the standard heated manifold with an atmospheric temperature of 20° F. due to the lower mixture temperature and probably in part to the lower cylinder jacket temperature as the result of the removal of the thermostatic control of the cooling water.

Operating in this manner with a low mixture temperature and low engine block temperature it was found that the octane selector could be advanced approximately two units when using a fuel of the same octane number. Accordingly corrections have been made in Table 6 as indicated for octane selector settings of 0 and 2° advance.

The effect of octane number on the acceleration is indicated in Table 7 which represents data obtained with a greater load in the car and operating over a different highway than has been used for all other tests. The effects of octane number on mileage is indicated in Figure 5 and in Table 8.

The relative data of Table 8 have been used for making adjustments in the results reported in Table 6 due to incorrect octane number setting. They may also be used to compare the relative gains in performance made possible by the use of more volatile fuels with those made possible by the use of fuels of different octane numbers. This has been done in Table 8 which tabulates the percentage gained in performance made possible by decreasing mixture temperatures 50° F. and using a more volatile fuel of the same octane number, with constant spark adjustment and with the spark advanced to compensate for the decreased knocking tendency of the motor when operating at the lower temperatures. Table 8 also includes a tabulation of the percentage gained in performance obtained by using a constant mixture temperature and fuel of constant volatility but increased in octane number from 43 to 65, and from 43 to 74, with the spark advanced to take full advantage of the increased octane number.

Comparison of these results obtained from the road tests as given in Table 8, indicates that the gain in performance found possible by decreasing the mixture temperature 50° F., is apparently uniform for different engines. This is also true for the gain reported due to increased octane number provided the engines have approximately the same octane requirement at the same compression ratio. An engine which has a high octane requirement at a low compression ratio may show greater effect of increased octane number.

For this reason and because the adjustment of the octane selector may not take full advantage of increased octane number in the higher brackets, in increased performance and economy as compared with an increase in compression ratio, there is some uncertainty as to the relationships given in Tables 7, 8 and 9 for different octane numbers as applied to other cars than the particular one used in these tests.

TABLE 7—EFFECT OF OCTANE NUMBER ON AVERAGE ACCELERATION

Average acceleration in feet per second per second for an increase in velocity of 20 miles per hour.

Car load 600 pounds.
Standard heated manifold.
Atmospheric temperature 65° F.
Fuel 1 plus ethyl fluid.
Carburetor adjustment FI.
68-58-53 rod intermediate stroke.

Octane selector	R 10	0	A 8
Corresponding octane number	28	65	80
Initial speed miles per hour			
5	2.495	2.845	2.955
15	2.305	2.69	2.805
25	2.24	2.495	2.505
Average	2.347	2.68	2.755
Relative acceleration	0.875	1.00	1.03

TABLE 8—EFFECT OF OCTANE SELECTOR POSITION ON REQUIRED OCTANE NUMBER AND RELATIVE PERFORMANCE

Octane selector	Octane number	Av. acceleration	Top speed	H.P. at top speed	Average mileage
A 8	80	1.03	1.007	1.022	1.014
A 6	78	1.026	1.006	1.019	1.012
A 4	74	1.02	1.0045	1.0165	1.010
A 2	70	1.012	1.0025	1.008	1.006
0	65–66	1.00	1.000	1.000	1.000
R 2	61	0.985	0.9975	0.992	0.992
R 4	57	0.965	0.995	0.9835	0.982
R 6	51	0.94	0.992	0.973	0.970
R 8	43	0.91	0.9885	0.960	0.956
R 10	28–30	0.875	0.984	0.945	0.940

The average acceleration using the best adjustment with Fuels 1 and 4 with the heated manifold at atmospheric temperatures of 85 and 50° F. is 2.82 feet per second. With the unheated manifold at 60° F. atmospheric temperature the average acceleration is 3.105 with the octane selector set at 0, which corresponds to a gain of 10.1 per cent; and 3.15 when the octane selector is set at +2 as permitted by the use of the unheated manifold and colder water jacket, which indicates a gain in acceleration of 11.7 per cent. These gains have been obtained by decreasing the

TABLE 6—DATA OBTAINED IN ACCELERATION TESTS WITH DIFFERENT FUELS AND DIFFERENT ADJUSTMENTS

Average acceleration in feet per second per second for an increase in velocity of 20 miles per hour. Car load 520 pounds.
Standard heated manifold. Octane selector 0. Equivalent to octane number 65.

Atmospheric temperature—	85°F.					50°F.					40°F.	
Initial speed	Fuel and carburetor adjustment					Fuel and carburetor adjustment					Fuel & carb. adj.	
miles per hour	1 EN	1 FN	2 EN	4 BS	3 BS	1 BS	2 BS	4 BI	3 BI	3 AI	1 FI	3 AI
5	2.97	2.91	2.91	2.96	3.00	2.96	2.99	2.96	3.00	2.98	2.82	2.36
15	2.88	2.88	2.85	2.83	2.83	2.88	2.82	2.82	2.82	2.85	2.83	2.37
25	2.60	2.60	2.60	2.62	2.57	2.62	2.68	2.62	2.59	2.73	2 73	2.37
35	2.19	2.26	2.19	2.20	2.20	....	2.195	2.20	2.20	....	....	....
Average	2.66	2.665	2.64	2.65	2.65	....	2.67	2.65	2.65	....	....	....
Average 5, 15, 25	2.82	2.80	2.79	2.80	2.80	2.82	2.83	2.80	2.80	2.85	2.79	2.37

Standard Heated Manifold

Atmospheric temperature—	20°F.				40°F.
Octane selector—	R 2 ⇔ 61 octane				0 ⇔ 65 octane
Initial speed	Fuel and carburetor adjustment				Fuel & carburetor adjustment
miles per hour	1 AI	2 AI	3 AI	3 AL	1 FI
5	3.97	3.81	2.17	2.54(1)	2.82
10	3.02	2.86	2.00	1.88(9)	2.85
15	2.99	2.75	1.87	1.90(6)	2.83
20	2.97	2.79	1.87	2.00(6)	2.79
25	2.94	2.8	2.00	2.31(2)	2.73
30	2.83	2.72	2.14	2.32(0)	2.61
Average	2.95	2.79	1.96	2.16(4)	2.77
Average 5, 15, 25	2.97	2.79	1.91	2.25(3)	2.79
Corrected to 0 octane selector	3.015	2.83	....	....	....
Corrected to A 2	3.05	2.864	....	....	....

Special Unheated Manifold

Atmospheric temperature—	60°F.			
Octane selector—	R 2 ⇔ 61 octane		A 2 ⇔ 69 octane	
Initial speed	Fuel and carburetor adjustment			
miles per hour	1 AI	1 ES	3 AI	3 AL
5	3.11	3.1	2.35(3)	2.92(0)
10	3.12	3.09	1.96(6)	2.42(2)
15	3.07	3.1	1.95(4)	2.38(5)
20	3.01	3.01	2.16(5)	2.41(5)
25	2.89	2.98	2.26(4)	2.42(2)
30	2.77	2.85	2.26(0)	2.55(0)
Average	3.00	3.02	2.17(4)	2.52(2)
Average 5, 15, 25	3.02	3.06	2.22(3)	2.57(2)
Corrected to 0 octane selector	3.065	3.105	....	....
Corrected to A 2	3.10	3.15	....	....

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mixture temperature about 50° F., and are in very good agreement with earlier laboratory results.

MacCoull found a gross gain in maximum power of 18.7 per cent for a decrease in the mixture temperature of 43° F. when taking full advantage of the increase in compression ratio made possible by both the lower temperature and by the increased octane number of the more volatile fuel used. The increased power obtained by the increased compression ratio made possible by the increased octane number of the more volatile fuel was independently found to be 7.2 per cent. So that the gain due to a decrease of 43° F. in the mixture temperature is 11.5 per cent as reported by MacCoull, compared with the 11.7 per cent obtained in these road tests for a decrease of 50° in the mixture temperature.

Our own earlier results obtained on the C.F.R. engine[7] indicated a net gain of 11.3 per cent for a decrease in mixture temperature of 50° F.

As indicated in Figure 1 the mixture temperature of current motor cars has been steadily decreased since about 1930. To 1935 this drop in mixture temperature has amounted to about 35° F. which is sufficient to cause an increase in acceleration and power of about 9 per cent.

An increase in octane number from 50 to 68 such as has occurred in the average motor fuel in the last 10 years is equivalent to an increase in power of about 8 per cent. Therefore the increased power of the modern automobile engine which requires a fuel of 65 octane number may credit a gain in power of 8 per cent to the increase in octane from 50 to 69 over the past 10 years, and an equal or greater gain in power to a decrease in mixture temperature of 35° F. during the past five years. Clearly the automotive engineers are alive to the possibilities in the use of fuels of high volatility (high volatility numbers) as well as the fuels of high octane number.

Referring again to Figure 1 it is apparent that there is about a two year lag between the introduction of a more volatile fuel and the commercial operation of motor cars of correspondingly reduced mixture temperatures. Octane numbers of house brand fuel have remained substantially constant for over two years. The volatility number of the average motor fuel has increased steadily to the present time so far as available data indicate. It is therefore to be expected that lower mixture temperatures will be used over the next two years as has been indicated by the extension of the mixture temperature line to the end of 1936 in Figure 1.

[7]Brown and Marshall, Proceedings 13th Annual Convention, Natural Gasoline Association of America, page 82 (1934).

TABLE 9—PERCENTAGE GAIN IN PERFORMANCE

	Gain due to decrease in mixture temperature 50°F. and use of more volatile fuel of same octane number		Constant mixture temperature, spark advanced to correspond to an increase in octane number	
Performance factor—	Constant spark	Spark readjusted for maximum power without knocking	From 43 octane to 65 octane number	From 43 to 74 octane number
Acceleration	10.1%	11.7%	9.9%	12.0%
Top speed	2.35%	2.6%	1.3%	1.8%
Mileage per lb. at top speed.	13.6%	14.1%	5.3%	5.3%
Mileage per gal. at top speed	7.0%	7.5%	5.3%	5.3%
Mileage per lb. of fuel at constant speed on level highway, part throttle	about 1%	about 2%	4.2%	4.9%

In order that further reduction in mixture temperature and corresponding increase in power may be obtained, it is necessary that the volatility of the average available motor fuel be still further increased.

The horizontal line labeled Fuel 1 and Fuel 2 in Figure 1 indicates the approximate mixture temperatures which could be used in cars with usual carburetors and manifold dimensions with Fuels 1 and 2 as shown in Figure 2. The indications are that such mixture temperatures or the equivalent in low manifold velocities will be adopted only when such fuels are generally available. since such low mixture temperatures require the use of such volatile fuels for satisfactory performance.

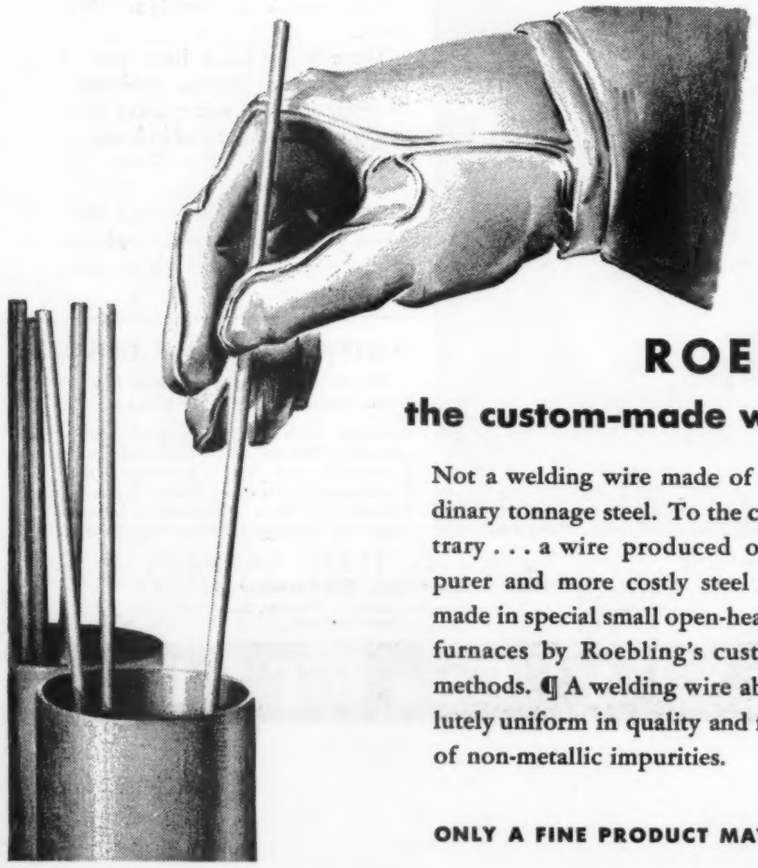
For fuels much more volatile than the present average, each decrease in mixture temperature of 1° F. requires a decrease in the 50 per cent point of almost 2° F. for equivalent performance.

A decrease in mixture temperature of about 4.3° F. increases the power output about 1 per cent.

Automobile manufacturers have and apparently will take full advantage of increased total volatility as it is made generally available. To date, however, they have unfortunately failed to show a willingness or ability to increase the vapor pressure tolerance of the fuel used. There are, however, developments under way which may reduce the occurrence of vapor lock in the fuel line so as to allow an increase in vapor pressure of 3 to 4 pounds. But this will still leave the carburetor itself vulnerable to vapor lock if exposed to high temperatures.

When the vapor pressure tolerance of the automobile is increased about 3 or 4 pounds, it appears that everything possible will have been done to enable the advantageous use of fuels of high volatility and vapor pressure.

Since 1925 when our first research program was started the average A.S.T.M. distillation curve for all fuels marketed has dropped approximately 40° F. throughout the entire range. The drop in 10 per cent point from about 165° F. to 127° F. has been fairly uniform and continuous over the 10 year interval but is apparently retarded because of vapor pressure limitations. The drop in 50 per cent point from 270° F. to 230° F. and in 90 per cent point from 385° F. to 345° F. did not get well under way until about 1929 or three years after our results were first made available, and has taken place largely in the last five years. Refinery technologists are again conscious of volatility and are using, not



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selling, their own natural and vapor recovery gasolines; and automotive manufacturers are aware of the gains in performance that may be obtained by proper design for volatile fuels. What this means and has meant to the producer of natural gasoline is not for me to say.

There is now a new factor, polymerization, which should be considered as to its effect on natural gasoline and fuel volatility. The catalytic process polymerizes propylene and butylene to higher boiling fractions and thereby reduces the available supply of refinery "butane" for blending purposes. In many cases the installation of such a "poly" unit indicates a deficiency of butane in such refinery, which deficiency may be made up by blending additional natural gasoline of higher butane content or by the actual blending of natural butane itself. The thermal processes of polymerization also polymerize the propylene and butylene and for that reason leave exactly the same general effect in tending to create a butane deficiency.

In addition, the thermal process will crack and polymerize natural butane, giving about a 40 per cent yield of higher boiling liquid products, and there is in process of development, a catalytic process for dehydrogenating or "cracking" natural butane into butylene that may then be polymerized with greater yields. Both of these operations will absorb some of the available butane and may readily absorb all the butane that is at present recoverable at no increase in operating costs.

With motor fuels of high volatility in demand, and motor cars being built that require highly volatile fuels for best performance and the polymerization processes tending to create a butane deficiency, it appears that the demand for natural gasoline will remain reasonably firm. At least, the situation for the immediate future is encouraging.

James E. DeLong Is Elevated to Presidency of Waukesha

At the recent meeting of the board of directors of the Waukesha Motor Co., Waukesha, Wis., James E. DeLong, vice president, who succeeded

JAMES E. DeLONG

the late H. L. Horning as general manager, was elevated to the presidency, and James B. Fisher, chief engineer, was elected vice president. Mr. DeLong's association with Waukesha Motor Co. dates back to 1923, when he joined the organization as field engineer in the development of its products for the oil industry. Mr. Fisher entered the engineering department as chief of design in 1914.

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NATURAL TRENDS

By T. W. LEGATSKI
Phillips Petroleum Co.

From a purely technical viewpoint the product of the natural gasoline industry is not natural gasoline. It is volatility. Therefore, when we speak of "Natural Trends" we must automatically take into account all of the sources of volatility regardless of the specific terminology employed. The object of this paper is to bring up to date our information on the volatility trends of motor fuel and also to show the relatively small part played by natural gasoline in this changing picture.

In a paper presented before the association one year ago by Oberfell, Alden and Trimble,[1] the volatility trends of motor fuels for the period of 1929 through 1934 were illustrated in a number of ways. It will be recalled that their paper dealt with the results of a comprehensive survey of fuels marketed in the central states. Samples were obtained periodically from 16 key cities. The test results were interpreted by applying tax return information to arrive at the weighted average quality. In substance, the conclusions reached as a result of their study were:

1. That the volatility of Mid-Continent motor fuels as reflected by vapor pressure and distillation characteristics had increased appreciably over the period.
2. That the increase in volatility had occurred almost in the same degree in each of the three grades of fuel. The increase was not limited to winter fuels.
3. That the greatest change had occurred in the region of the 50 per cent and 90 per cent distillation points.
4. That the spread between the characteristics of extreme types of fuels had remained substantially constant throughout the five-year period covered by the survey.
5. Other data available to the authors indicated the trend in quality was not limited to Mid-Continent fuels but applied in a lesser degree to all parts of the country.

TABLE 1—AVERAGE CHARACTERISTICS OF SEVERAL MAJOR MOTOR FUELS YEARLY BY MONTHS

Month—	R.V.P.	Vol. No.	Butane
1929			
December	8.14	21	6.20
1930			
January	8.05	21	6.10
February	8.06	22	6.00
March	8.10	22	6.00
April	8.02	21	6 10
May	8.09	21	6.15
June	8.07	22	6.00
July	8.09	22	6.00
August	8.11	22	6.05
September	8.08	22	6.00
October	8.02	22	5.95
November	8.03	21	6.05
December	8.03	21	6 05
1931			
January	8.15	21	6 20
February	8.17	21	6.20
March	8.14	21	6.20
April	8.25	21	6.30
May	8.39	22	6.35
June	8.54	22	6.55
July	8.61	22	6.60
August	8.65	22	6 65
September	8.64	22	6.65
October	8.67	22	6.65
November	8.70	23	6.65
December	8.73	24	6.55
1932			
January	8.76	25	6.45
February	8.82	26	6.45
March	8.86	26	6.50
April	8 86	27	6.40
May	8 76	27	6.30
June	8.64	28	6.10
July	8.53	29	5.90
August	8.53	30	5.85
September	8.59	32	5.75
October	8.58	33	5.70
November	8.67	34	5.75
December	8.75	35	5.75
1933			
January	8.74	36	5 70
February	8 78	37	5.70
March	8.77	37	5.70
April	8.75	38	5.60
May	8.78	38	5.65
June	8.80	39	5.65
July	8.89	40	5.70
August	8.93	41	5.70
September	8 94	42	5.65
October	9.01	42	5.75
November	9.00	43	5.70
December	9.01	43	5.70
1934			
January	9.08	44	5.70
February	9.13	44	5.75
March	9.15	45	5.75
April	9.18	46	5 75
May	9.20	46	5.80
June	9.22	47	5.80
July	9.23	47	5.80
August	9.18	48	5.65
September	9.20	48	5.65
October	9.20	48	5.70
November	9.27	48	5 75
December	9.27	48	5 80
1935			
January	9.28	48	5.80
February	9.27	49	5.75
March	9.32	49	5.80
April	9.34	49	5.80
May	9.34	49	5.80
June	9.42	50	5 85
July	9.44	50	5 85
August	9.45	49	5.95
September	9.44	49	5.95
October	9.46	48	6.00
November	9.46	49	5.95
December	9.50	49	6.05
1936			
January	9.55	49	6.10
February	9.59	49	6.15
March	9 62	50	6.15

[1]The Oil and Gas Journal, July 4, 1935.

***N.G.A.A.*—Delivered before Tulsa meeting, Natural Gasoline Association of America.**

In Table 1 and in Figure 2 a new method is used to present the everchanging picture of motor fuel quality. This method tends to smooth out the irregularities and strikingly illustrates the long-time trends. The data are the "yearly by months" averages for the same four companies previously referred to.

It will be noted that the vapor pressure has been steadily increasing at the rate of about a quarter of a pound a year. The mid-point volatility as measured by volatility numbers increased greatly during the period of 1932 through 1934. Since that time it has suffered little change and appears to be undergoing a temporary breathing spell. The butane content averages presented in the lower graph started out by being irregular. During 1933 and 1934 the butane content averaged about 5.7 per cent. Since that time the butane content has increased until at present it averages somewhat over 6 per cent. The butane contents shown in this graph were arrived at by applying the graphic analytical method of Alden and Blair.[2] These methods have been repeatedly checked against actual analyses for verification with excellent results.

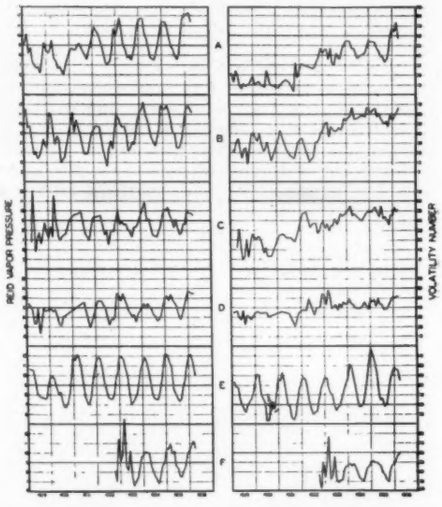

Fig. 1—Volatility trends of a number of major housebrand gasolines

When the three curves of vapor pressure, volatility number and butane content are examined simultaneously, a number of cases of inter-relationship are immediately obvious. The irregularities in the vapor pressures and butane contents prior to

[2]"Economic Outlets for Natural Gasoline and Liquefied Petroleum Gases." Proceedings Thirteenth Annual Meeting A.P.I., Houston, Tex., Nov. 16, 1932.

TABLE 2—EFFECT OF NATURAL GASOLINE ON MOTOR FUEL VOLATILITY QUANTITIES IN M. BARRELS

Year	Total production of Motor fuel	Total production of Natural gasoline	Natural in M.F. per cent	Volatility Nos. Motor fuel W.	Volatility Nos. Motor fuel S.	Volatility Nos. Motor fuel Av.	Ref. base	Volatile ref. gaso. in base M. barrels	Volatile ref. gaso. in base Per cent of M.F.
1918	90,556	6,727	7.42	..	..	..	..	.....	....
1919	101,145	8,370	8.28	..	..	..	..	.....	....
1920	124,030	9,161	7.39	25	16	21½	11	.....	....
1921	132,248	10,713	8.10	23	22	23	12	.....	....
1922	157,742	12,044	7.64	17	14	16	6	.....	....
1923	194,977	19,434	9.97	17	15	16	3	.....	....
1924	223,018	22,235	9.97	17	13	15	2	.....	....
1925	268,667	26,307	9.79	18	9	14	0	.....	....
1926	306,605	32,305	10.54	20	18	19	5	10,472	3.58
1927	339,910	38,657	11.37	20	17	19	4	9,038	2 66
1928	387,722	42,326	10.92	23	19	21	7	16,579	4.28
1929	444,859	52,271	11.75	21	21	21	5	15,704	3.53
1930	444,391	52,631	11.84	28	24	26	12	33,300	7.49
1931	441,837	43,617	9.87	..	..	31	20	55,751	12.62
1932	403,603	36,281	8.99	..	..	40	31	77,138	19.11
1933	411,706	33,610	8.16	..	..	46	39	94,524	22.96
1934	427,034	36,556	8.56	..	..	46	39	94,524	22.96
1935	465,514	38,858	8.35	..	..	50	42	113,064	24.29

Notes: Production figures from A.P.I. Statistical Bulletin, May, 1934. Volatility Nos. 1920 to 1930, inc. from Bureau of Mines Semiannual Surveys. 1935 production data from Bureau of Mines Preliminary Statement included in December, 1935, monthly statement.

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A study of worn parts from most stabilizers will show the upper washers or bearing supports have taken the thrust, proving the stabilizer or guide is offering resistance to the downward movement of the bit or core barrel. With the **Sievers Reamers,** the same test will show the lower washer or thrust bearing (the bearing upon which the bottom of the cutter rotates), has taken the wear, proving the reamer exerts a force in the same direction as the weight on the bit, which naturally tends towards faster drilling speed.

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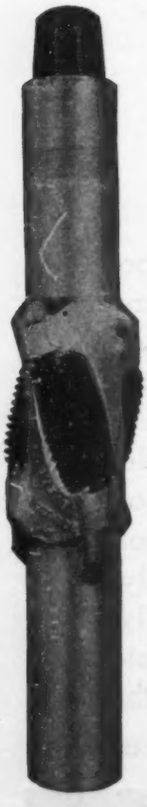

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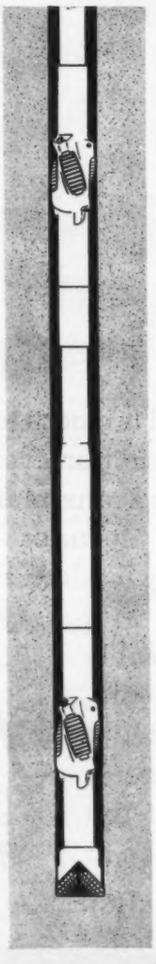

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1933 are probably traceable to failure on the part of refiners to effectively de-propanize their products. The drop in vapor pressure and in butane content which occurred in 1932 may be due to a sad awakening on the part of refiners, a realization that fuel systems of cars were unable to han-

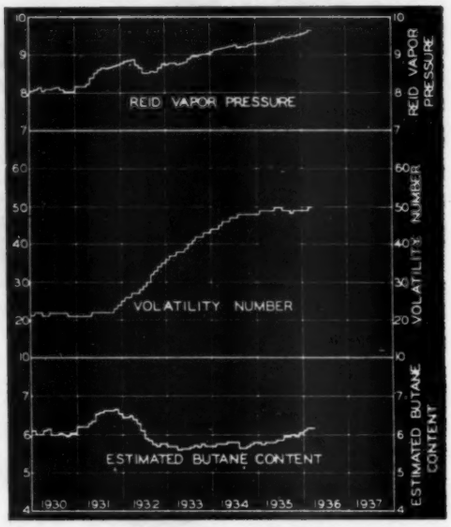

Fig. 2—Average characteristics of several major motor fuels. (Yearly by months.)

dle the new higher pressure fuels. The set-back, however, was only a temporary one. The steady increase in vapor pressure, since the time of that temporary decrease is mute evidence that powerful economic forces within the oil industry over which gasoline manufacturers have little or no control are at work. It is the economic pressure of large volumes of butane endeavoring to reach a logical market outlet.

Returning to the subject of volatility we find that in the years 1933 and 1934 the vapor pressure was steadily increasing while the butane content remained substantially constant. It is obvious that the increased mid-point volatility is the answer for the increasing vapor pressure during this period. A little later on, through 1935, we find the mid-point volatility becoming constant but the vapor pressure is still increasing at about its normal rate. The answer for this is found in the butane content which was also gradually increasing.

Now that we have shown the trend in volatility characteristics it will be of interest to determine from whence this volatility comes. Vague statements have frequently been made during the past several years regarding the change in the relative volumes of natural and refinery vapor recovery gasolines. Again it is a changing picture upon which we believe some light can be thrown by applying our knowledge of blending. Therefore, let us start with the information we have available on volatility numbers and work backwards.

Volatility number as applied to motor fuels, by our definition, is the numerical difference between the observed 50 per cent evaporated temperature and 284° F. which is the maximum mid-point temperature of U. S. Motor specification gasoline. Since this maximum mid-point temperature of 284° F. represents the least volatile gasoline acceptable under the specifications, such gasoline is designated as having a volatility number of zero.

A survey of average gasolines as established by the Bureau of Mines reports shows that at no time since 1920 has the volatility number of motor fuel been as low as zero. It appears from these data that the lowest volatility ever offered occurred in 1925 during which year the average volatility number was 14. The quantity of natural gasoline produced in that year represented 9.79 per cent of the total motor fuel. When this volume of light gasoline is deducted from the average fuel of that year it appears the volatility number of the refinery-produced gasoline was exactly zero. This gives us a logical starting point.

From 1925 on we are confronted with other factors in addition to natural gasoline which contribute to motor fuel volatility. Of these factors vapor recovery gasoline is probably the most im-

portant. At the beginning of 1925 oil cracking processes were accounting for about 25 per cent of the motor fuel production. Refinery vapors which up to that time had been largely wasted or used for fuel gas were beginning to be processed for the recovery of light gasolines similar to natural gasoline. The increasing quantities of light gasolines recovered from refinery vapors cannot be very accurately established due to its immediate absorption in the motor fuel stream. Other factors such as the adoption of more extensive and more drastic cracking, the adoption of operations involving the manufacture of low endpoint straightrun and the reforming of naphthas, etc., all contribute to make the picture more complicated. The combined effect of these factors is an increase of 42 volatility numbers, i.e., the volatility number of refinery produced gasoline rose from zero in 1925 to 42 in 1935. The volume of light refinery gasoline of the vapor recovery type necessary to effect a change of that magnitude can readily be calculated.

Thus, if it is assumed that the heavy refinery base of 1935 was still a zero volatility number product such as we had in 1925, it would have required 113,064,000 bbls. of a product similar in character to natural gasoline to produce the quality of that year's refinery gasoline. The addition of the 38,858,000 bbls. of natural produced in that year served to further increase the volatility number

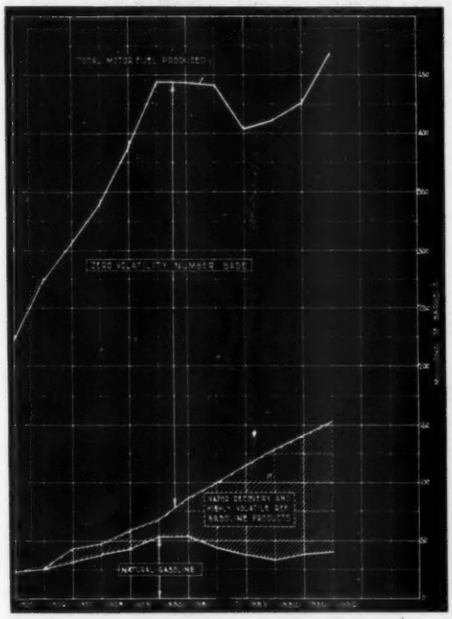

Fig. 3 — Natural gasoline and volatile refinery products in motor fuel

from 42 to 50. Table 2 shows the relative amounts of natural and vapor recovery gasoline for the last 10-year period. The same information is presented graphically in Figure 3. It will be noted that approximately three-quarters of the light gasoline which supplied the motor fuel volatility of 1935 was produced in the refineries. This is almost the exact reverse of the situation in 1926 when the bulk of the volatility was supplied by natural gasoline.

The changing picture of fuel volatility as to source and as to volumes has been accompanied by a marked change in the objectives of our industry. In 1926 we were chiefly interested in fitting fuels to engines. Today our objective is to see that new engines are properly fitted to today's and tomorrow's gasoline, and not to yesterday's gasoline. Colder manifolds and cooler carburetors will be necessary to make the most of this new gasoline. Some of us may be inclined to harbor fears for the future of volatility but such things have a happy way of taking care of themselves. It should be remembered that every step taken by automotive manufacturers to remove heat from the induction systems not only makes the more volatile fuels desirable but compels the marketers to supply more volatile products.

The writer wishes to acknowledge the helpful assistance of M. G. Blair in preparing the tables, charts and slides for this paper.

A Core Driller

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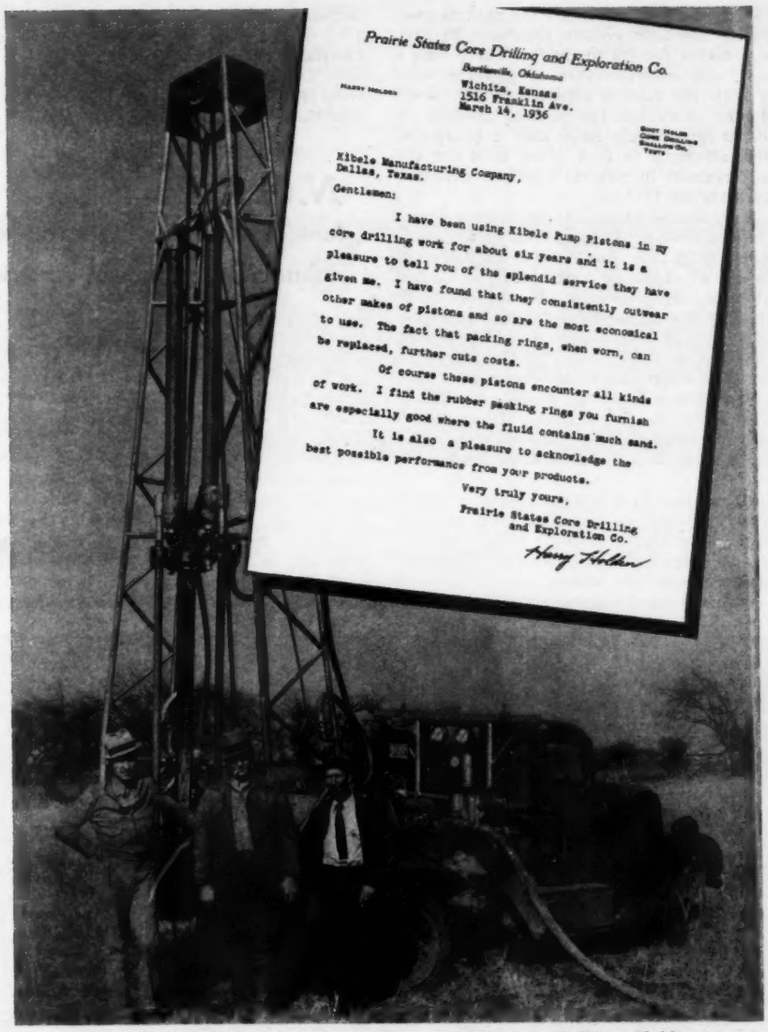
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The "Spectacular" Hydrocarbons

By DR. SIDNEY BORN
Director of Petroleum Research, University of Tulsa

For some years the natural gasoline industry has been greatly interested in finding new markets for its products. There was a time when the manufacturers of gasoline were satisfied with the market afforded by the motor fuel industry. Although the natural gasoline industry dates back hardly more than a quarter of a century, attempts to find other uses for the products contained in natural gasoline were initiated as early as 1914.

The chemical industries of the United States cover such a vast field that they affect every phase of our daily life. The food we eat is raised with the aid of chemical fertilizer. The clothes we wear are prepared with the aid of many chemical substances; they are colored with synthetic dyes, and in some cases—as artificial silk and rayon—are in themselves chemical products. The stem of the pipe in which you smoke your tobacco is a chemical product and has probably been made partly from natural gas. It may seem strange that a material as solid as your pipestem can be made from an almost intangible material like gas.

Natural gasoline is composed almost entirely of paraffin hydrocarbons, ranging from propane to decane or even higher in some cases. Natural gas itself may have all these hydrocarbons and in addition methane and ethane.

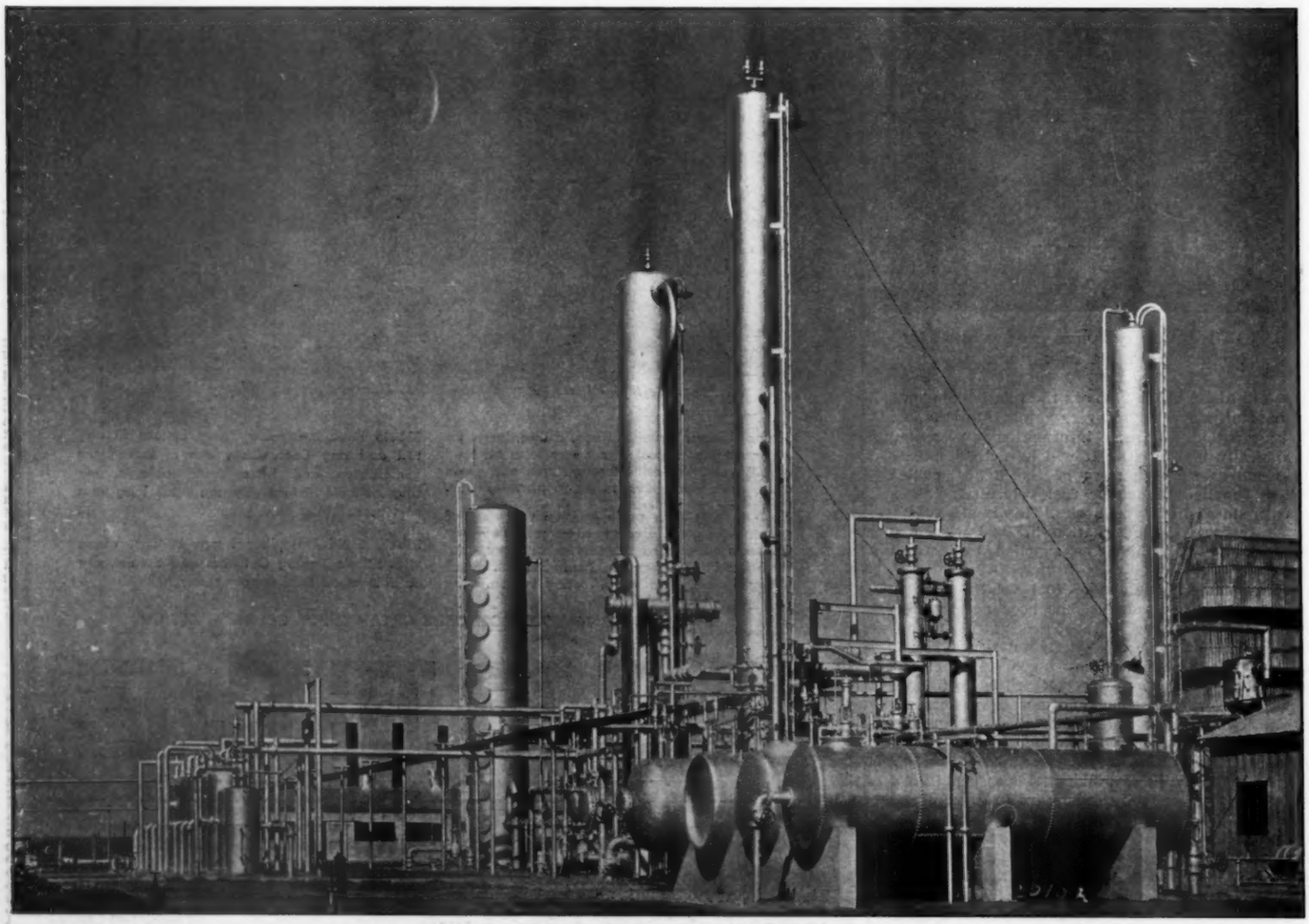
In considering raw materials for any manufacturing purpose, cost is a prime consideration. Two of the most widely used chemicals for industrial purposes are salt and sulfuric acid. Salt sells for about $8 a ton and sulfuric acid for about $16 a ton. Let us consider for a moment how the cost of natural gas compares with these products. One thousand cubic feet of natural gas weighs approximately 50 pounds and if natural gas is figured at 10 cents per 1,000 cubic feet, this will make a ton of natural gas cost approximately $4, so we have as a raw material a very cheap product.

***N.G.A.A.*—Delivered before Tulsa meeting, Natural Gasoline Association of America.**

The next consideration in choosing a raw material for use in our chemical industries is reactivity; that is, the substance must be capable of reacting with various reagents to form new substances and must be capable of forming new materials under the influence of heat and pressure. The hydrocarbons found in natural gas are ideal substances from this standpoint.

Among the first chemical substances to be synthesized from natural gasoline was amyl acetate. There was a great demand for amyl acetate during the World War as this substance was needed in the manufacture of explosives. Until the World War this material was manufactured from amyl alcohol and acetic acid, both products of natural fermentations.

On account of a great shortage, American chemists were faced with the necessity of finding a new source of raw material for this substance. They found such a raw material in the pentane fraction of natural gasoline. It is a comparatively simple thing to fractionate natural gasoline and isolate the pentane. The pentane is then subjected to the action of chlorine gas under fixed conditions, until a predetermined amount of chlorine has been absorbed. The products formed by this reaction are then washed and redistilled to recover a product known as amyl chloride, which is pentane in which one hydrogen atom has been displaced by chlorine. The amyl chloride is heated with sodium acetate under pressure, resulting in the production of amyl acetate. Not only is amyl acetate widely used in the explosive industry, but it is also used as a solvent in the manufacture of artificial silks, celluloid, photographic films, imitation leathers and the manufacture of quick-drying lacquers and paints. Some



Distillation equipment in Skelly Oil Company's revamped gasoline plant near Fairfax, Oklahoma

of you may be familiar with this substance under the more common name of "banana oil."

Another interesting development has been the manufacture of ethylene glycol from ethylene and chlorine gas. A plant for the manufacture of this substance has been in operation for years by the Carbide & Carbon Chemical Co. This material has been used in the preparation of antifreeze compounds for automobile radiators. It is sold under trade names of Prestone, and has many advantages over the other materials used for this purpose. Ethylene glycol is also used as a solvent in the manufacture of concentrated fruit flavors, flavoring extracts, and similar commodities. It is used in the manufacture of cosmetics, in the treatment of skins and furs, in the moistening of tobacco, in the leather industry, and in the textile industry in the treating and finishing of fabrics. Some of the esters and ethers of ethylene glycol are widely used in the chemical industry as solvents for cellulose nitrate, gums, shellacs, etc. Other compounds are used in the preparation of lacquers, wetting, cleansing and emulsifying agents.

Other chlorinated derivatives of the olefins have been manufactured for years and have been used extensively in the manufacture of rubber goods.

For years the creation of synthetic rubber has claimed the attention of chemists. Natural rubber is made from a sticky, milky fluid, called latex, which is found between the inner wood and the outer bark of the rubber tree. When latex is mixed with a suitable coagulant the rubber separates out as a light doughy mass which is the raw material from which most of our rubber goods have been manufactured.

About 15 years ago a chemist in Kansas City was attempting to produce a new antifreeze for automobile radiators. In his experiments he mixed some ethylene dichloride and sodium polysulfide. Instead of obtaining the clear-looking liquid he was expecting, he obtained a mass which looked and felt and behaved like rubber.

From this interesting beginning developed the first artificial commercial rubber produced in the United States. The product developed in this manner is sold under the name of "thiokol" and while it is not exactly the same as natural rubber, yet many products manufactured therefrom are more suitable for their purpose than the natural rubber would be.

Among the things made from this material are rubber hose for gasoline and oil; hose for lacquer sprays; rollers for printing-presses; and for such purposes it is superior to natural rubber.

The DuPont company has also developed an artificial rubber which, for many purposes, is superior to natural rubber. That is, the product is more resistant to oxidation and to chemical actions. This material is sold under the trade name of "Duprene" and is made from acetylene. The acetylene is first changed to vinyl acetylene and then, by the addition of hydrochloric acid to chloroprene, which is then polymerized to an artificial, rubber-like substance.

The reaction between ethylene and sulfuric acid was understood as early as 1821 by Hennel, who pointed out that alcohol or ether could be produced by this reaction. Nothing seems to have been done, however, until Fritsche, in 1900, built a plant near Richmond, Va., where ether was commercially produced from oil gas until 1907 when the removal of the revenue tax from industrial alcohol permitted the production of ether from alcohol at a cost below that at which it could be profitably manufactured from oil gas. This price factor, however, would not hold true if the oil gas were a by-product of a cracking operation.

Similarly, higher alcohols and their esters can be produced from other, unsaturated hydrocarbons by the action of sulfuric acid, and subsequent hydrolysis. A pilot plant for carrying out these reactions was constructed under the writer's direction in Okmulgee about 18 years ago. The process is now being carried out commercially by the Standard Oil Development Co. for the production of these higher alcohols.

When natural gas is burned with a sufficient supply of air the reaction products consist of carbon dioxide and water, but if the supply of air is restricted and the conditions controlled many different reaction products may be obtained, such as formaldehyde, methyl alcohol, acetylene, and unsaturated hydrocarbons. Possibly some of you have noticed the peculiar odor arising when a gas burner blows back and combustion takes place at the base of the burner with an insufficient air supply. A great deal of work has been done on this problem and numerous patents have been granted on variations of this general reaction. A plant has been in operation for some time in Oklahoma in which natural gas is mixed with air and carbon dioxide and heated to a temperature of 800 to 900° F. in the presence of a catalyst. This catalyst may consist of platinum, palladium, copper, chromium, manganese, iron, nickel or the oxides of these substances. Pressure ranging from 100 to 300 pounds is employed, and formaldehyde and methyl alcohol are obtained in commercial quantities by this reaction. Formaldehyde is used for the production of synthetic resins, and methyl alcohol is largely used as an antifreeze in automobile radiators.

It is possible to point out to you only a few of the many substances that can be manufactured from the hydrocarbons present in natural gas and natural gasoline. Thousands of different materials may be produced synthetically from these raw materials. Even to give a list of the products that are being made and can be made would probably require several hours.

It seems to me that we have barely scratched the surface of a mine whose hidden treasures are so vast in extent that it is almost impossible completely to visualize them.

There is not a single field of commercial enterprise in which it will not play a role. Great credit is due to the men of vision and the men of courage who have pioneered this work. In an industry whose background dates back not over 25 years the work has just been started. Much development, research and pains taking effort must be expended to carry it on. To those who succeed the reward should be very rich indeed.

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Summary of Operations, All Fields, March

SUMMARY OF ALL FIELDS

Rigs and Wells Drilling

	Rigs	Dig.	Ttl.
Penna. Grade fields	53	253	306
Central Ohio	25	74	99
Lima	7	30	37
Indiana	0	20	20
Kentucky	7	19	26
Michigan	86	111	197
Kansas	58	290	348
Oklahoma	97	463	560
N. Cen. Texas	73	242	315
West Texas	67	228	295
Texas Panhandle	31	136	167
East Cen. Texas	11	58	69
East Texas	86	186	272
East Texas Border	12	15	27
Southwest Texas	45	185	230
Gulf Coast Texas	33	106	139
Gulf Coast Louisiana	14	61	75
North Louisiana	43	102	145
Arkansas	11	26	37
Montana	16	59	75
Wyoming	7	52	59
Colorado	3	25	28
New Mexico	9	93	102
Utah	1	8	9
Total March	795	2,842	3,637
Total February	766	2,764	3,530
Difference	29	78	107

Wells Completed

	Comp.	Prod.	Dry	Gas
Penna. Grade fields	190	576	10	37
Central Ohio	16	5	8	7
Lima	1	0	1	0
Indiana	7	60	4	1
Kentucky	23	1,788	5	0
Michigan	40	4,065	9	11
Kansas	115	59,144	22	1
Oklahoma	160	79,160	47	9
N. Cen. Texas	217	8,361	100	8
West Texas	108	50,626	14	2
Texas Panhandle	51	26,449	1	15
East Cen. Texas	19	933	7	1
East Texas	232	7,461	11	0
East Texas Border	2	4,200	0	0
Southwest Texas	276	100,840	56	6
Gulf Coast Texas	95	25,546	29	5
Gulf Coast Louisiana	43	20,719	13	0
North Louisiana	36	29,507	7	3
Arkansas	7	820	5	0
Montana	7	349	2	0
Wyoming	8	8,853	1	0
Colorado	4	2,002	0	0
New Mexico	42	53,728	4	2
Utah	3	0	3	0
Total March	1,691	485,212	359	108
Total February	1,350	347,637	282	116
Difference	341	137,575	77	8

KANSAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rgs.	Dig.	Ttl.
Barton	15	9,650	3	0	6	25	31
Butler	3	726	1	0	1	6	7
Chase	1	100	0	0	0	1	1
Coffey	1	0	1	0	0	2	2
Cowley	13	3,602	5	0	2	18	20
Ellis	1	170	0	0	2	12	14
Ellsworth	4	3,320	1	0	2	6	8
Finney	0	0	0	0	1	0	1
Graham	0	0	0	0	0	2	2
Greenwood	7	435	3	0	4	12	16
Grant	0	0	0	0	0	1	1
Harper	0	0	0	0	0	1	1
Harvey	1	0	0	1	0	7	7
Haskell	0	0	0	0	1	1	2
Kearney	0	0	0	0	1	0	1
Kingman	0	0	0	0	0	2	2
Morris	0	0	0	0	0	1	1
Marion	1	250	0	0	0	2	2
McPherson	2	1,715	0	0	2	8	10
Norton	0	0	0	0	0	1	1
Ness	0	0	0	0	0	2	2
Osage	0	0	0	0	0	1	1
Pratt	1	0	1	0	0	1	1
Reno	12	3,806	0	0	4	25	29
Rice	17	12,085	1	0	13	55	68
Rooks	2	313	0	0	1	3	4
Rush	1	465	0	0	1	5	6
Russell	18	11,108	3	0	9	46	55
Scott	0	0	0	0	0	1	1
Sedgwick	1	345	0	0	0	6	6
Stafford	2	1,548	0	0	1	5	6
Stevens	0	0	0	0	0	3	3
Sumner	9	4,891	1	0	4	18	22
Trego	1	0	1	0	1	4	5
Woodson	3	115	1	0	2	7	9
Ttl. Mar.	115	59,144	23	1	58	290	348
Ttl. Feb.	79	27,239	21	0	57	262	319
Diff'ce.	36	31,905	1	8	1	28	29

OKLAHOMA

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Dig.	Ttl.
Alfalfa	0	0	0	0	0	1	1
Atoka	0	0	0	0	0	4	4
Beaver	1	0	1	0	0	0	0
Beckham	0	0	0	0	1	3	4
Blaine	0	0	0	0	0	1	1
Bryan	1	0	1	0	1	0	1
Caddo	0	0	0	0	0	7	7
Carter	6	230	1	0	4	20	24
Choctaw	0	0	0	0	0	2	2
Cleveland	0	0	0	0	0	3	3
Coal	0	0	0	0	0	1	1
Comanche	8	2	7	0	0	10	10
Cotton	1	3	0	0	0	0	0
Creek	11	227	4	0	4	32	36
Garfield	0	0	0	0	0	4	4
Garvin	0	0	0	0	1	3	4
Grady	0	0	0	0	0	5	5
Grant	1	0	1	0	0	1	1
Harmon	0	0	0	0	0	2	2
Hughes	9	2,536	0	1	4	16	20
Jackson	2	254	0	0	0	11	11
Jefferson	0	0	0	0	0	4	4
Johnston	0	0	0	0	1	1	2
Kay	1	0	0	1	0	5	5
Kiowa	3	30	1	0	0	3	3
LeFlore	0	0	0	0	0	1	1
Lincoln	5	2,967	2	0	1	7	8
Logan	2	3,170	0	0	1	10	11
Love	0	0	0	0	0	3	3
Marshall	4	15	3	0	0	7	7
McClain	0	0	0	0	0	1	1
McIntosh	0	0	0	0	0	1	2
Murray	0	0	0	0	0	1	1
Muskogee	3	38	1	0	1	8	9
Noble	4	2,759	2	0	2	6	8
Okfuskee	11	775	1	2	5	16	21
Oklahoma	9	16,767	1	0	22	30	52
Okmulgee	10	460	6	1	5	28	33
Osage	18	3,542	4	0	9	36	45
Pawnee	1	0	1	0	1	3	4
Payne	0	0	0	0	2	5	7
Pittsburg	1	0	1	0	0	1	1
Pontotoc	28	39,723	2	2	14	71	85
Pottawatomie	4	902	0	0	1	11	12
Pushmataha	0	0	0	0	0	1	1
Roger Mills	1	0	1	0	0	0	0
Seminole	14	4,711	1	0	10	44	54
Stephens	4	6	3	0	2	10	12
Tillman	0	0	0	0	1	2	3
Tulsa	4	43	1	1	2	15	17
Wagoner	2	0	1	1	1	4	5
Washita	0	0	0	0	0	1	1
Ttl. Mar.	160	79,160	47	9	97	463	560
Ttl. Feb.	140	69,649	31	19	80	461	541
Difference	29	9,511	16	10	17	2	19

GULF COAST Texas

Summary of Field Operations

Field—	Comp.	Prod.	Abd.	Gas	Rigs	Dig.	Ttl.
Amelia	1	75	0	0	0	3	3
Anahuac	11	6,823	1	0	3	6	9
Barbers Hill	4	915	0	0	1	2	3
Batson	0	0	0	0	1	1	2
Big Hill	1	0	1	0	1	0	1
Big Creek	2	80	1	0	0	1	1
Blue Ridge	1	45	0	0	1	2	3
Boling	0	0	0	0	0	1	1
Bryan Mound	0	0	0	0	0	1	1
Clay Creek	1	0	1	0	2	0	2
Cleveland	1	280	0	0	0	1	1
Coletto Creek	2	192	1	0	1	0	1
Conroe	5	1,554	0	0	0	1	1
Damon Mound	2	30	0	0	1	0	1
Dickinson	2	1,217	0	0	2	5	7
Esperson	2	168	1	0	2	1	3
Fannett	0	0	0	0	0	2	2
Greta	2	330	1	0	0	2	2
Hankamer	0	0	0	0	0	1	1
Hardin	0	0	0	0	0	1	1
Hastings	3	1,744	0	0	2	6	8
High Island	0	0	0	0	0	4	4
Hull	2	300	1	0	0	1	1
Humble	1	0	1	0	0	1	1
Livingston	1	339	0	0	0	1	1
Lockridge	1	75	0	0	0	0	0
Lost Lake	1	0	0	1	0	0	0
Louise	1	257	0	0	0	2	2
Manvel	4	420	2	1	1	5	6
Markham	1	0	1	0	1	0	1
Mykawa	1	696	0	0	0	1	1
Orange	0	0	0	0	0	1	1
Orchard	1	0	1	0	1	2	3
Pickett Ridge	4	1,305	0	1	1	3	4
Pierce Junc.	0	0	0	0	1	4	5
Placedo	6	1,600	0	1	4	3	7
Port Neches	0	0	0	0	0	1	1
Raccoon Bend	3	720	0	1	0	2	2
Refugio	0	0	0	0	0	1	1
Saratoga	0	0	0	0	1	0	1
South Bay City	1	230	0	0	0	0	0
So. Houston	5	1,302	2	0	0	6	6
Tomball	5	1,968	0	0	0	4	4
Tomoconner	1	1,337	0	0	1	0	1
Turtle Bay	0	0	0	0	1	1	2
Van Vleck	2	1,540	0	0	1	1	2
Withers	0	0	0	0	1	2	3
Miscel.	14	0	14	0	2	23	25
Ttl. Mar.	95	25,546	29	5	23	106	139
Ttl. Feb.	82	25,746	23	2	37	103	140
Diff.	13	200	6	3	4	3	1

Louisiana

Summary of Field Operations

Field—	Comp.	Prod.	Abd.	Gas	Rigs	Dig.	Ttl.
Bay St. Elaine	1	0	1	0	0	0	0
Bayou Mallet	1	324	0	0	0	0	0
Black Bayou	0	0	0	0	0	3	3
Caillou Island	2	2,202	0	0	0	3	3
Cameron Meadows	1	71	0	0	1	2	3
Cheneyville	1	212	0	0	1	2	3
Choctaw	0	0	0	0	0	1	1
Darrow	1	576	0	0	0	1	1
Dog Lake	0	0	0	0	0	1	1
Edgerly	0	0	0	0	1	1	2
Garden Island	0	0	0	0	0	1	1
Gillis	5	2,630	0	0	1	4	5
Hackberry	2	670	1	0	2	3	5
Iowa	1	429	0	0	0	3	3
Jeanerette	1	1,118	0	0	1	2	3
Jennings	2	760	0	0	0	2	2
Lafitte	0	0	0	0	0	2	2
Lake Barre	1	366	0	0	1	1	2
Lake Hermitage	1	0	1	0	0	0	0
Lake Pelto	1	960	0	0	0	0	0
Leesville	3	4,269	0	0	1	1	2
Port Barre	1	0	1	0	0	2	2
Roanoke	3	3,432	0	0	1	2	3
St. Martinsville	0	0	0	0	0	2	2
Sorrento	0	0	0	0	1	1	2
Starks	0	0	0	0	0	1	1
Sulphur	2	1,210	0	0	0	2	2
Tepetate	2	1,077	0	0	0	5	5
Vinton	3	123	2	0	0	0	0
White Castle	1	350	0	0	0	0	0
Miscel.	7	0	7	0	3	13	16
Ttl. Mar.	43	20,719	13	0	14	61	75
Ttl. Feb.	23	8,560	8	0	20	74	94
Diff.	20	12,159	5	0	6	13	19

WEST TEXAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Dig.	Ttl.
Andrews	1	0	0	1	0	2	2
Brewster	0	0	0	0	0	2	2
Concho	0	0	0	0	0	2	2
Crane	8	6,696	1	0	6	5	11
Cochran	0	0	0	0	1	0	1
Crockett	1	0	1	0	0	4	4
Culberson	1	0	1	0	0	0	0
Dawson	0	0	0	0	1	0	1
Ector	5	2,763	0	0	9	17	26
Edwards	0	0	0	0	0	3	3
El Paso	0	0	0	0	0	2	2
Fisher	2	552	1	0	1	6	7
Gaines	1	0	1	0	0	3	3
Garza	0	0	0	0	0	1	1
Glasscock	2	56	1	0	0	2	2
Howard	10	6,845	0	0	8	12	20
Hudspeth	0	0	0	0	0	1	1
Irion	0	0	0	0	0	1	1
Jeff Davis	0	0	0	0	0	1	1
Jones	7	3,648	2	0	4	28	32
Loving	1	50	0	0	0	1	1
Lynn	1	0	1	0	0	0	0
Martin	0	0	0	0	0	2	2
Menard	0	0	0	0	0	1	1
Mitchell	1	0	1	0	0	1	1
Nolan	0	0	0	0	0	1	1
Pecos	13	2,119	1	0	6	16	22
Presidio	0	0	0	0	0	1	1
Reagan	0	0	0	0	0	1	1
Reeves	1	0	1	0	0	1	1
Runnels	0	0	0	0	0	2	2
Schleicher	0	0	0	0	0	2	2
Scurry	0	0	0	0	1	2	3
Taylor	0	0	0	0	0	2	2
Terrell	0	0	0	0	0	1	1
Tom Green	0	0	0	0	0	1	1
Upton	11	2,650	1	0	3	12	15
Ward	15	9,366	0	1	13	44	57
Winkler	26	15,781	1	0	13	43	56
Yoakum	0	0	0	0	1	1	2
Ttl. Mar.	108	50,626	14	2	67	228	295
Ttl. Feb.	75	37,463	10	2	59	242	301
Diff.	32	13,163	4	0	8	14	6

EAST CENTRAL AND EAST TEXAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Dig.	Ttl.
Anderson	9	776	0	1	3	10	13
Angelina	0	0	0	0	0	3	3
Bowie	1	0	1	0	0	2	2
Cherokee	1	60	0	0	0	3	3
Ellis	0	0	0	0	0	1	1
Falls	0	0	0	0	0	1	1
Fannin	0	0	0	0	0	6	6
Franklin	0	0	0	0	0	1	1
Freestone	1	0	1	0	1	1	2
Gregg	98	3,061	4	0	35	59	94
Henderson	1	133	0	0	0	8	8
Hill	0	0	0	0	0	2	2
Kaufman	0	0	0	0	0	2	2
Lamar	1	0	1	0	0	2	2
Limestone	1	0	1	0	0	2	2
McLennan	0	0	0	0	1	0	1
Morris	1	0	1	0	0	0	0
Nacogdoches	1	0	1	0	0	1	1
Navarro	1	7	0	0	0	1	1
Rains	0	0	0	0	0	1	1
Red River	0	0	0	0	0	2	3
Rockwall	0	0	0	0	0	1	1
Rusk	84	3,037	3	0	33	70	103
Smith	17	422	4	0	2	15	17
Titus	0	0	0	0	0	5	5
Upshur	22	881	0	0	16	39	55
Van Zandt	2	17	1	0	1	5	6
Ttl. Mar.	241	8,394	18	1	97	244	341
Ttl. Feb.	208	7,733	14	1	129	203	332
Doff.	33	661	4	0	32	41	9

SOUTHWEST TEXAS

Summary of Field Operations

Field—	Comp.	Prod.	Abd.	Gas	Rigs	Dig.	Ttl.
Agua Dulce	1	0	0	1	0	0	0
Baldwin	1	0	1	0	0	0	0
Blas Uribe	1	0	1	0	0	0	0
Callihan	2	90	0	0	1	3	4
Carolina-Texas	0	0	0	0	0	1	1
Clark	0	0	0	0	0	2	2
Cole	1	150	0	0	0	1	1
Dale	0	0	0	0	0	1	1
Dirks	6	2,125	0	0	1	2	3
Eagle Hill	1	0	1	0	0	1	1
Escobas	2	35	1	0	1	2	3
Gillette	1	150	0	0	0	2	2
Govt. Wells	4	185	0	1	0	1	1
Haynes	4	50	2	0	1	1	2
Hoffman	3	0	2	1	0	6	6
Jacob	3	400	0	0	0	1	1
Loma Novia	66	25,580	2	0	2	24	26
Lopez	23	9,225	1	0	1	9	10
Mercedes	0	0	0	0	1	2	3
Mt. Lucas	1	0	1	0	0	0	0
O'Hern	11	2,860	2	1	2	3	5
Pearsall	2	22,860	0	0	0	6	6
Pettus	1	190	0	0	1	1	3
Piedra Lumbre	5	1,060	0	0	1	1	2
Plummer	0	0	0	0	0	1	1
Plymouth	7	1,180	1	0	3	5	8
Ray	1	200	0	0	2	1	3
Rio Grande City	2	15	1	0	0	0	0
Salt Flats	0	0	0	0	0	1	1
Samfordyce	12	580	2	1	0	7	7
Sandia	1	0	1	0	0	0	0
San Diego	0	0	0	0	0	1	1
Saxet	14	5,890	1	0	3	11	14
Saxet Heights	24	7,715	1	0	3	19	22
Seven Sisters	31	17,165	3	0	2	19	21
Taft	2	840	1	0	1	1	2
Von Ormy	3	10	0	0	2	1	3
Zobrowolski	1	0	0	1	0	1	1
Miscel.	39	2,285	31	0	17	47	64
Ttl. Mar.	276	100,840	56	6	45	185	236
Ttl. Feb.	176	52,395	39	6	32	175	207
Diff.	100	48,445	17	0	13	10	23

NORTH AND CENTRAL TEXAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Dig.	Ttl.
Archer	44	848	24	0	11	29	40
Baylor	0	1,537	3	0	0	6	6
Brown	2	30	0	1	5	3	8
Callahan	9	42	5	0	3	10	13
Clay	3	10	2	0	0	5	5
Coleman	2	125	1	0	1	3	4
Comanche	1	0	0	1	1	4	5
Collin	0	0	0	0	0	2	2
Cooke	25	672	7	0	7	38	45
Denton	0	0	0	0	0	4	4
Eastland	4	30	2	1	2	6	9
Erath	1	0	1	0	0	1	1
Foard	1	25	0	0	0	1	1
Grayson	0	0	0	0	0	2	2
Hamilton	1	0	0	1	1	2	3
Jack	8	48	1	0	5	19	24
Johnson	0	0	0	0	0	1	1
McCulloch	0	0	0	0	0	3	3
Mills	0	0	0	0	0	1	1
Montague	6	92	2	0	3	9	12
Parker	0	0	0	0	0	1	1
Shackelford	24	1,251	12	1	8	18	26
Stephens	5	0	3	2	2	2	4
Tarrant	0	0	0	0	0	1	1
Throckmorton	2	0	2	0	2	2	4
Wichita	19	497	5	0	5	20	25
Wilbarger	13	1,007	4	0	4	20	24
Wise	1	0	1	0	0	2	2
Young	46	2,147	25	1	12	27	39
Ttl. Mar.	217	8,361	100	8	73	242	315
Ttl. Feb.	178	5,386	79	4	61	233	294
Diff.	39	2,975	21	4	12	9	21

TEXAS PANHANDLE

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Dig.	Ttl.
Carson	2	935	0	0	5	7	12
Cottle	0	0	0	0	0	1	1
Gray	17	8,935	1	1	5	43	48
Hall	0	0	0	0	0	1	1
Hartley	0	0	0	0	0	1	1
Hutchinson	12	5,785	0	1	11	38	49
Moore	8	0	0	8	2	18	20
Ochiltree	0	0	0	0	1	0	1
Potter	1	0	0	1	0	0	0
Roberts	0	0	0	0	0	2	2
Wheeler	11	8,994	0	4	7	25	32
Ttl. Mar.	51	26,449	1	15	31	136	167
Ttl. Feb.	42	15,774	3	11	28	122	150
Diff.	9	10,675	2	4	3	14	17

North Louisiana

Summary of Field Operations

	Comp.	Prod.	Dry	Gas*	Rigs	Dig.	Ttl.
Bienville	2	0	2	0	2	1	3
Bossier	0	0	0	0	1	3	4
Caddo	25	28,932	1	1	25	57	82
Caldwell	0	0	0	0	0	2	2
Claiborne	1	0	1	0	0	4	4
Concordia	0	0	0	0	0	1	1
De Soto	1	220	0	0	1	6	7
Franklin	0	0	0	0	1	0	1
Grant	0	0	0	0	1	4	5
Jackson	2	0	2	0	1	0	1
La Salle	0	0	0	0	0	2	2
Lincoln	0	0	0	0	0	3	3
Morehouse	1	0	0	1	5	3	8
Ouachita	1	0	0	1	0	0	0
Red River	0	0	0	0	1	1	2
Richland	0	0	0	0	0	2	2
Sabine	2	355	0	0	2	7	9
Tensas	0	0	0	0	0	1	1
Union	0	0	0	0	3	1	4
Vernon	0	0	0	0	0	1	1
Webster	0	0	0	0	0	3	3
Winn	1	0	1	0	0	0	0
Ttl. Mar.	36	29,507	7	3	43	102	145
Ttl. Feb.	47	37,117	8	7	42	95	137
Diff.	11	7,610	1	4	1	7	8

Arkansas

	Comp.	Prod.	Dry	Gas*	Rigs	Dig.	Ttl.
Arkansas	0	0	0	0	1	0	1
Ashley	1	0	1	0	0	0	0
Calhoun	0	0	0	0	0	1	1
Clarke	0	0	0	0	0	1	1
Columbia	0	0	0	0	0	1	1
Dallas	0	0	0	0	0	1	1
Hempstead	0	0	0	0	2	2	4

Lafayette ..	0	0	0	0	0	5	5
Miller	0	0	0	0	5	5	10
Monroe	1	0	1	0	0	0	0
Ouachita ...	2	0	2	0	0	3	3
Pulaski	0	0	0	0	0	1	1
Union	3	820	1	0	3	6	9
Ttl. Mar...	7	820	5	0	11	26	37
Ttl. Feb...	8	1,910	4	0	16	24	40
Diff.	1	1,090	1	0	5	2	3

Note—The initial production of Rodessa field, Caddo Parish, is the initial gauge through one-half inch choke and not the potential open flow.

*Gas production: Caddo, 15,000,000; Morehouse, 2,000,000; Ouachita, 2,000,000; total 19,000,000 feet.

East Texas (Border Counties)

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rgs.	Dlg.	Ttl.
Cass	2	4,200	0	0	4	4	8
Harrison .	0	0	0	0	2	2	4
Panola ...	0	0	0	0	2	4	6
Marion ...	0	0	0	0	2	2	4
Shelby ...	0	0	0	0	2	3	5
Ttl. Mar..	2	4,200	0	0	12	15	27
Ttl. Feb..	2	1,600	0	1	9	13	22
Difference	0	2,600	0	1	3	2	5

ROCKY MOUNTAIN AREA

New Mexico

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rgs.	Dlg.	Ttl.
Bernalillo .	0	0	0	0	0	2	2
McKinley .	1	0	1	0	1	5	6
Rio Arriba.	0	0	0	0	1	0	1
Santa Fe .	0	0	0	0	0	2	2
San Juan .	3	39	0	1	1	8	9
Torrance .	0	0	0	0	0	2	2
Valencia ..	0	0	0	0	1	3	4
Harding ..	0	0	0	0	0	1	1
Quay	0	0	0	0	0	1	1
San Miguel	0	0	0	0	0	2	2
Torrance ..	0	0	0	0	0	1	1
Chaves ...	0	0	0	0	0	1	1
Lea	35	53,461	2	1	5	55	60
Eddy	3	188	1	0	0	10	10
Ttl. Mar.	42	53,728	4	2	9	93	102
Ttl. Feb..	33	45,587	6	1	16	97	113
Difference	9	8,141	2	1	7	4	11

Colorado

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rgs.	Dlg.	Ttl.
Adams ...	0	0	0	0	0	2	2
Archuleta .	1	2,000	0	0	0	4	4
Boulder ..	1	2	0	0	0	0	0
Huerfano .	0	0	0	0	0	3	3
Jefferson .	0	0	0	0	1	1	2
Larimer ..	0	0	0	0	0	2	2
Moffat ...	0	0	0	0	1	1	2
Park	0	0	0	0	0	1	1
Prowers ..	1	0	1	0	0	0	0
Weld	1	0	1	0	0	0	0
Miscl.	0	0	0	0	1	11	12
Ttl. Mar.	4	2,002	2	0	3	25	28
Ttl. Feb..	2	0	2	0	3	30	33
Difference	2	2,002	0	0	0	5	5

Wyoming

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rgs.	Dlg.	Ttl.
Albany ...	0	0	0	0	0	2	2
Big Horn .	1	400	0	0	1	11	12
Carbon ...	4	8,395	1	0	2	6	8
Converse .	0	0	0	0	0	3	3
Fremont ..	0	0	0	0	0	2	2
Lincoln ..	0	0	0	0	0	2	2
Hot Springs	0	0	0	0	0	2	2
Niobrara ..	0	0	0	0	2	7	9
Park	1	50	0	0	1	2	3
Sweetwater.	0	0	0	0	0	2	2
Sublet	0	0	0	0	0	3	3
Uinta	0	0	0	0	0	2	2
Washakie .	0	0	0	0	0	3	3
Weston ..	2	8	0	0	0	3	3
Miscl.	0	0	0	0	1	2	3
Ttl. Mar..	8	8,853	1	0	7	52	59
Ttl. Feb..	4	1,680	3	0	6	55	61
Difference	4	7,173	2	0	1	3	2

Montana

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rgs.	Dlg.	Ttl.
Big Horn .	0	0	0	0	0	2	2
Carbon	0	0	0	0	0	2	2
Fergus ...	0	0	0	0	0	6	6
Glacier ...	4	234	1	0	11	21	32
Petroleum .	0	0	0	0	0	3	3
Pondera ..	0	0	0	0	2	2	4
Teton	1	0	1	0	0	0	0
Toole	2	135	0	0	3	15	18
Miscl.	0	0	0	0	0	8	8
Ttl. Mar..	7	369	2	0	16	59	75
Ttl. Feb..	4	371	0	2	10	60	70
Difference	3	2	2	2	6	1	5

Utah

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rgs.	Dlg.	Ttl.
Washington.	3	0	3	0	0	5	5
Miscl.	0	0	0	0	1	3	4
Ttl. Mar..	3	0	3	0	1	8	9
Ttl. Feb..	0	0	0	0	1	11	12
Difference	3	0	3	0	0	3	3

EASTERN FIELDS

Summary of Field Operations

	Comp.	Prod.	Dry	Gas	Rigs	Dlg.	Ttl.
S.W. Penn. ..	6	18	2	2	6	26	32
S.E. Ohio ...	20	375	4	5	8	51	59
West Virginia	44	37	4	30	28	101	129
Bradford ...	102	116	0	0	7	60	67
Allegany	6	6	0	0	0	1	1
Venango-Clarion ...	9	14	0	0	2	7	9
Butler-Armstrong	3	10	0	0	2	7	9
Ttl. Mar....	190	576	10	37	53	253	306
Ttl. Feb....	178	941	8	30	47	248	295
Diff.	12	365	2	7	6	5	11

MICHIGAN

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Dlg.	Ttl.
Alcona	0	0	0	0	1	1	2
Arenac	0	0	0	0	1	1	2
Bay	0	0	0	0	1	0	1
Chippewa	0	0	0	0	0	1	1
Clare	0	0	0	0	1	0	1
Clinton	0	0	0	0	1	0	1
Eaton	0	0	0	0	0	1	1
Gladwin	2	125	1	0	12	9	21
Gratiot	2	0	1	1	2	6	8
Isabella	1	15	0	0	11	6	17
Ionia	1	0	1	0	1	1	2
Kent	0	0	0	0	1	2	3
Mason	0	0	0	0	0	3	3
Mecosta	6	0	1	5	11	6	17
Midland	6	2,213	0	0	13	14	27
Monroe	0	0	0	0	1	1	2
Montcalm ...	15	1,500	3	5	22	33	55
Newygo	0	0	0	0	1	1	2
Oceana	0	0	0	0	0	2	2
Ogemaw	4	192	0	0	2	9	11
Saginaw	2	20	1	0	3	7	10
St. Clair	0	0	1	0	1	3	4
Tuscola	1	0	1	0	0	3	3
Wayne	0	0	0	0	0	1	1
Ttl. Mar....	40	4,065	9	11	86	111	197
Ttl. Feb....	33	5,145	10	7	78	130	208
Diff.	7	1,080	1	4	8	19	11

INDIANA

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Dlg.	Ttl.
Daviess	0	0	0	0	0	2	2
Dearborn	0	0	0	0	0	1	1
Johnson	0	0	0	0	0	1	1
Knox	1	0	1	0	0	4	4
Gibson	1	0	0	0	0	1	1
Perry	1	0	1	0	0	4	4
Vanderburg .	1	60	0	0	0	0	0
Pike	2	0	1	1	0	5	6
Spencer	1	0	1	0	0	1	1
Sullivan	0	0	0	0	0	1	1
Ttl. Mar....	7	60	4	1	0	20	20
Ttl. Feb....	9	15	7	1	0	12	12
Diff.	2	45	3	0	0	8	8

LIMA FIELD

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Dlg.	Ttl.
Wood	0	0	0	0	0	3	3
Henry	0	0	0	0	0	2	2
Hancock	0	0	0	0	0	1	1
Allen	0	0	0	0	1	3	4
Auglaize	0	0	0	0	0	3	3
Mercer	0	0	0	0	0	1	1
Hardin	0	0	0	0	3	1	4
Ottawa	0	0	0	0	0	1	1
Logan	0	0	0	0	1	0	1
Seneca	0	0	0	0	0	6	6
Sandusky	0	0	0	0	0	4	4
Wyandot	0	0	0	0	1	5	6
Putnam	0	0	0	0	1	0	1
Harrison	1	0	1	0	0	0	0
Ttl. Mar....	1	0	1	0	7	30	37
Ttl. Feb....	3	1	2	0	3	29	32
Diff.	2	1	1	0	4	1	5

CENTRAL OHIO

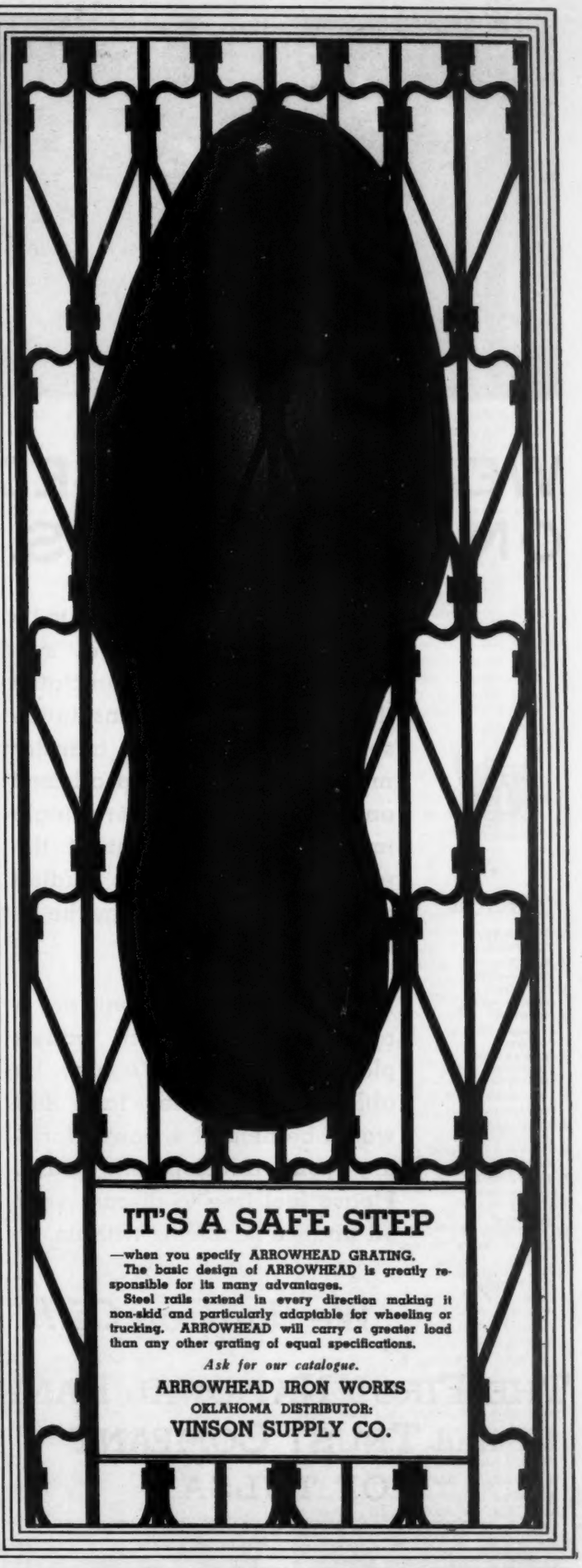
Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Dlg.	Ttl.
Wayne	1	0	0	1	3	3	6
Ashland	0	0	0	0	3	2	5
Lorain	2	0	0	2	2	4	6
Cuyahoga ...	1	0	1	0	0	0	0
Richland	0	0	0	0	1	3	3
Tuscarawas ..	0	0	0	0	0	2	2
Holmes	1	0	1	0	5	6	11
Summitt	0	0	0	0	3	7	10
Coshocton ...	3	0	1	2	1	5	6
Huron	0	0	0	0	2	0	2
Stark	3	0	3	0	1	22	23
Gallia	0	0	0	0	0	4	4
Scioto	0	0	0	0	0	1	1
Pike	0	0	0	0	0	4	4
Lawrence ...	0	0	0	0	1	3	4
Delaware	0	0	0	0	0	1	1
Fairfield	2	0	0	2	2	5	7
Hocking	1	5	0	0	1	3	4
Belmont	1	0	1	0	0	0	0
Perry	1	0	1	0	0	0	0
Ttl. Mar....	16	5	8	7	25	74	99
Ttl. Feb....	22	187	6	13	32	83	115
Diff.	6	182	2	6	7	9	16

KENTUCKY

Summary of Field Operations

County—	Comp.	Prod.	Dry	Gas	Rigs	Dlg.	Ttl.
Ohio	3	98	0	0	0	3	3
McLean	14	1,445	4	0	7	10	17
Warren	1	30	0	0	0	2	2
Henderson ...	3	115	1	0	0	2	2
Muhlenberg ..	1	100	0	0	0	2	2
Ttl. Mar....	32	1,788	5	0	7	19	26
Ttl. Feb....	5	538	1	0	0	1	1
Diff.	17	1,250	4	0	7	18	25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California Oil Field Operations for March, 1936

Total stocks of crude and all products in Pacific Coast territory decreased during the month 88,890 bbls. The total stocks at the end of the month were 136,438,584 bbls. The total stock increase for 1936, up to March 31 was 5,809,938 bbls.

CRUDE PETROLEUM PRODUCTION

(Figures of production and stocks are in barrels of 42 gallons)

	Total Production	Daily average		
Group No. 1—	March	Mar., 1936	Feb., 1936	Mar., 1935
Belridge-North	249,538	8,050	8,434	6,615
Belridge-South	66,300	2,139	2,114	2,432
Coalinga	572,036	18,453	18,209	18,578
Edison	143,805	4,639	5,153	1,289
Elk Hills	265,433	8,562	8,853	7,804
Fruitvale	202,209	6,523	6,854	3,765
Kern River	418,370	13,496	14,405	10,700
Kettleman Middle Dome	15,429	498	430	108
Kettleman North Dome	2,383,517	76,888	79,875	65,098
Lost Hills	112,100	3,616	4,081	4,481
McKittrick	56,293	1,815	3,626	3,258
Midway-Sunset	1,643,393	53,012	53,599	51,496
Mountain View	854,400	27,561	31,697	12,425
Mount Poso	565,039	18,227	18,838	12,134
Round Mountain	284,040	9,163	9,061	4,895
Wheeler Ridge	11,353	366	358	439
Group No. 2—				
Capitan	43,489	1,403	1,390	708
Elwood	367,207	11,845	12,700	9,997
Rincon	52,355	1,689	1,860	1,174
San Miguelito	42,227	1,362	1,031	538
Santa Barbara	54,125	1,746	1,681	3,381
Santa Maria	119,972	3,870	3,565	4,090
Summerland	1,319	43	30	59
Ventura Avenue	1,038,308	33,494	33,981	18,756
Ventura-Newhall	131,829	4,253	4,061	4,059
Watsonville	1,860	60	60	60
Group No. 3—				
Brea-Olinda	232,873	7,512	7,505	10,416
Coyote-East	71,345	2,301	2,317	2,705
Coyote-West	251,702	8,119	8,265	9,796
Dominguez	832,163	26,844	30,889	21,145
Huntington Beach	1,107,900	35,739	37,130	39,681
Inglewood	368,541	11,888	12,214	10,483
Lawndale	8,372	270	251	143
Long Beach	2,167,124	69,907	71,321	65,642
Los Angeles-Salt Lake	26,474	854	795	827
Montebello	245,459	7,918	6,951	5,799
Newport	.....	.....	.....	.....
Playa Del Rey	398,129	12,843	13,685	15,860
Potrero	9,215	297	343	366
Richfield	195,483	6,306	6,445	8,041
Rosecrans	69,047	2,227	2,074	2,838
Santa Fe Springs	1,332,476	42,983	44,234	38,765
Seal Beach	290,903	9,384	9,469	9,200
Torrance	207,549	6,695	6,631	6,734
Whittier	30,323	978	963	1,001
Total	17,541,014	565,839	587,428	497,781
February	17,035,430	587,428	.....	.....
Decrease	505,584*	21,589		

*Increase.

OIL FIELD DEVELOPMENT

	New rigs up	Active drilling	Producers completed	Daily initial output	Active producing	Abd. wells drillers	Abd. wells producers
Group No. 1—							
Belridge-North	...	8	...	.....	29	...	...
Belridge-South	...	...	...	.....	196	...	...
Coalinga	2	5	...	.....	939	4	1
Edison	1	9	2	450	66	1	...
Elk Hills	...	...	...	.....	163	...	...
Fruitvale	5	6	3	462	88	1	...
Kern River	10	9	6	1,031	1,448	...	...
Kettleman Middle Dome	...	1	...	.....	3	1	...
Kettleman North Dome	4	31	5	11,963	117	...	...
Lost Hills	...	1	...	.....	265	...	...
McKittrick	4	4	...	.....	120	...	...
Midway-Sunset	10	10	7	2,163	2,331	...	...
Mountain View	5	14	6	4,027	137	1	...
Mount Poso	2	7	4	1,374	196	4	...
Round Mountain	5	4	8	2,447	75	...	...
Wheeler Ridge	...	1	...	.....	34	...	...
Group No. 2—							
Capitan	...	2	...	.....	21	...	...
Elwood	...	2	...	.....	64	...	...
Rincon	...	1	...	.....	29	1	...
San Miguelito	...	...	...	.....	6	...	...
Santa Barbara	...	...	...	.....	61	1	...
Santa Maria	1	...	1	2,375	188	...	...
Summerland	...	...	...	.....	19	...	...
Ventura Avenue	1	6	1	1,470	218	...	...
Ventura-Newhall	1	15	1	10	553	1	...
Watsonville	...	...	...	.....	7	...	...
Group No. 3—							
Brea Olinda	...	...	...	.....	345	...	...
Coyote-East	...	...	...	.....	81	...	...
Coyote-West	...	...	1	764	56	...	...
Dominguez	2	6	1	1,840	113	...	...
Huntington Beach	...	2	3	247	520	...	...
Inglewood	1	1	1	370	210	...	...
Lawndale	...	2	...	.....	7	...	...
Long Beach	2	8	4	502	1,256	...	1
Los Angeles-Salt Lake	...	...	...	.....	127	...	...
Montebello	2	15	1	107	193	...	...
Newport	...	1	...	.....	.....	...	...
Playa Del Rey	1	4	2	180	211	...	...
Potrero	...	...	...	.....	12	...	...
Richfield	...	1	1	20	251	...	...
Rosecrans	...	...	...	.....	76	...	...
Santa Fe Springs	1	5	4	924	607	...	...
Seal Beach	1	3	...	.....	111	...	...
Torrance	10	5	...	.....	499	...	...
Whittier	...	...	...	.....	161	1	...
Miscellaneous drilling	13	42	...	.....	.....	10	...
Group No. 4, gas fields—							
Buttonwillow	...	...	...	.....	1	...	...
Delano	...	...	1	Gas	.....	...	...
Dudley Ridge	...	...	...	.....	.....	1	...
Goleta	...	...	...	.....	.....	...	...
Semi-Tropic	...	...	...	.....	.....	...	...
Tracy	...	1	...	.....	4	...	...
March	84	232	63	32,726	12,214	27	2
February	73	208	43	13,561	12,691	34	35
Increase	11	24	20	19,165	477*	7*	33*
Average for year 1935	86	243	64	55,082	12,136	29	17
Average for year 1934	53	196	38	47,553	11,053	21	17
Average for year 1933	30	124	21	22,842	9,199	14	18

*Decrease.

California Field Report

PROSPECT OF ANOTHER POOL IN SAN JOAQUIN OIL DISTRICT

By
L. P. STOCKMAN

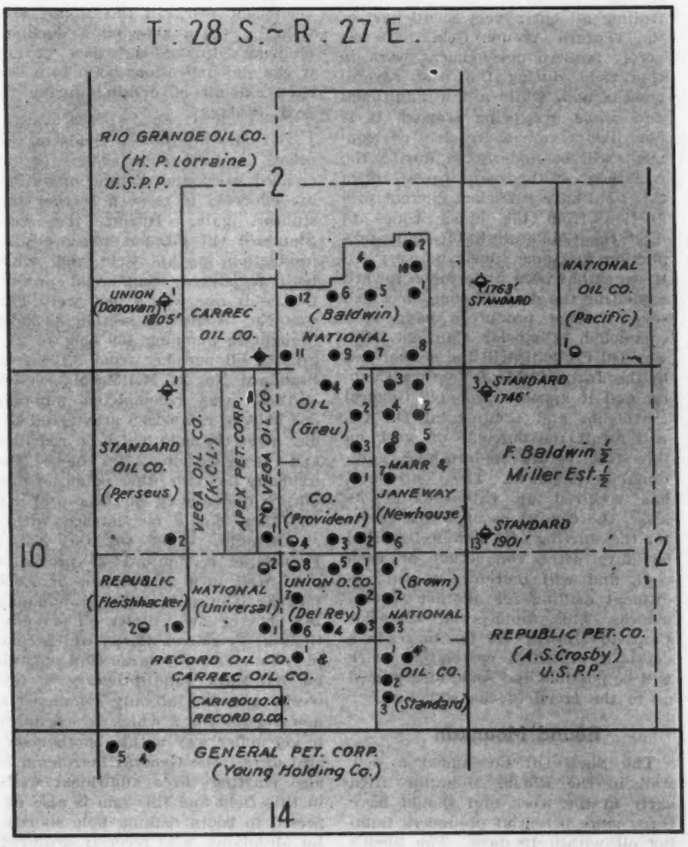
LOS ANGELES, Calif., May 18.—The Shell Oil Co. and Ohio Oil Co. have focused the attention of operators on the area midway between the Fruitvale field of Kern County and Buena Vista Lake gas field as a result of important showings in the former's No. 1 K.C.L., section 29-30-26, and leasing activities have been rather brisk during the past few weeks. Shell and Ohio, however, are drilling in the center of extensive blocks, and very little favorably located acreage is available. The Shell's wildcat on the Kern County Land Co. property has been bottomed at 7,888 feet and the hole is being reamed preparatory to landing and cementing of a water string. This well has shown up exceptionally good. The Ohio's wildcat is approximately 5 miles north of the Shell's test and, while it is not deep enough to pick up the pay, correlation work indicates it is running only a little lower than the Shell Co. test in section 29-30-26.

Prospecting work of the Shell and Ohio in the area between Fruitvale and the Buena Vista Lake gas field is especially significant because these two prospects are located on the floor of the San Joaquin Basin and along a geophysical high that has been rather definitely established. In 1932 Wilshire Oil Co. drilled a 6,995-foot duster in section 7-29-24 at what since has been found to be approximately 2 miles northwest of the geophysical high now being tested by Shell Oil Co. and Ohio Oil Co. Approximately 50 miles northwest of this area, Barnsdall Oil Co. is testing out several hundred acres in section 24-28-17. Barnsdall's holdings in this section of the state approximate 250,000 acres and the company's first test is being drilled on a visible structure. Subsequent prospecting work will be predicated to a large extent on the result of an extensive geophysical survey. It will probably require about two years to complete Barnsdall's exploratory work in this area. Barnsdall's extensive block of potentially productive acreage is located in San Luis Obispo County west of the Temblor Range.

Los Angeles Basin Wildcats

Exploratory work in Los Angeles Basin, contrary to expectations, has been revived due to several interesting discoveries and will probably show a further increase before the close of the year. The development of commercial production immediately above the basement complex in the El Segundo area by Republic Petroleum Co. and the finding of small production in the Wilmington district has greatly stimulated wildcat operations in Los Angeles Basin. The search has been further intensified by the heavy gas pressure and showings of oil found by Eastern Oil Co. No. 1 D.R.L.&W., east of the Playa Del Rey field of Los Angeles Basin. As a result of the outcome of work by the Republic Petroleum in the El Segundo area and the encouraging indications of oil and gas found by Eastern Oil Co., an intensive search has been instituted by prospectors in the western rim of Los Angeles Basin. This work extends all the way along the rim of the basin between the Play Del Rey field and the Wilmington area, immediately adjacent to Los Angeles harbor. The significance of the Ohio's discovery in Playa Del Rey field did not become apparent for several years, but its importance was revealed when the Republic Petroleum Co. completed its discovery well in the El Segundo district last year. The importance of these discoveries was further emphasized by encouraging showings of oil and gas found by Eastern Oil Co. in its Playa Del Rey field outpost, and prospectors are acquiring leases to start several additional tests. Until a short time ago, geologists were of the opinion that any new fields found around the western rim of Los Angeles Basin must be located along well established sheer zones, but this theory has since been proven fallacious and as a consequence, prospectors are now drilling at several points between Wilmington and Playa Del Rey. These prospectors are working on the assumption that the Schist was laid down unconformably and that subsequent accumulations of oil and gas collected in the low points without respect to any sheering or faulting that might have occurred in the overlying strata. This is contrary to the geological and geographical location of fields located along the Newport-Beverly sheer zone, although Playa Del Rey, El Segundo and Lawndale fields line up rather uniform. The Torrance-Redondo field, however, is clearly out of line and lies at an angle with respect to the Newport-Beverly sheer zone and any possible line of sheering that might dominate the accumulations at Playa Del Rey, El Segundo and Lawndale.

United Oil Co. has started work on a wildcat in the extreme eastern part of San Luis Obispo County, approximately 30 miles west and south of the area now being prospected by the Shell and Ohio in Kern County. The geological formations found in the vicinity of United Oil Co.'s wildcat in descending order are McKittrick, subdivided into the Paso Robles (Tulare), Etchegoin and Jacalitos of Pliocene age; Santa Margarita, Upper Monterey, of Miocene age; Maricopa brown shale, Lower Monterey, of Middle Miocene age; Temblor formation, of lower Middle Miocene age; Vaqueros formation, of Lower Miocene age; Kreyenhagen formation, of Oligocene age, and rocks of Eocene and Cretaceous age. United Oil Co. No. 2 Panorama is in section 2-32-21, approximately 6 miles west of the Midway-Sunset field of Kern County in the Panorama Hills. United Oil Co. estimates the top of the Eocene at approximately 6,000 feet, but expects to encounter potentially productive oil sand in the Santa Margarita at approximately 2,000 feet. Top of the Temblor is expected to be encountered at about 3,500 feet.



West Front section of Kern River field, California, where operators are succeeding in extending the limits of commercial production

Elwood

The Barnsdall and Rio Grande, jointly developing several leases in the Elwood field of Santa Barbara County, recompleted No. 9 on state tideland permit No. 88, and this well was returned to production flowing 1,860 bbls. of clean 35.9 gravity oil and 1,980,000 feet of gas per day. The Barnsdall, which is doing the actual drilling in this field, redrilled and deepened this well from the Vaqueros to the Sespe and finished it with a 6⅝-inch liner including 100 feet of perforated after bottoming the hole at 3,735 feet. The liner was landed on bottom and cemented through perforations at 3,655 feet. Honolulu Oil Corp. No. 9 on state tideland permit No. 90, proved a disappointment on a production test early this week. This well never produced heretofore from either the Vaqueros or Sespe and the small production developed this week was decidedly unfavorable. It was carried into the Eocene but was plugged back from 7,014 feet to 6,705 feet, from which depth it showed an initial daily production of 80 bbls. of 34.9 gravity oil cutting 40 per cent and approximately 900,000 feet of gas per day. This well was finished with a 6⅝-inch liner including 326 feet of perforated and cemented through perforations at 4,622 feet and 6,366 feet using the multiple stage of cementing.

Bankline Oil Co. has been making rather slow progress in its operations in the Coal Oil Point district of Santa Barbara County, but difficulty was anticipated due to the complicated condition of the original hole drilled on this prospective structure by Bolsa Chica Oil Co. several years ago. The Bankline began redrilling operations a few weeks ago but its whipstocked hole deviated to such an

extent that it encountered the Bolsa Chica's original hole at 629 feet. The Bankline then plugged back to 472 feet and has just resumed redrilling operations. Coal Oil Point is approximately 3 miles east of the Elwood field of Santa Barbara County. The first test drilled on the Coal Oil Point structure was by Bolsa Chica Oil Co. and, while this well failed to result in commercial production, the company did encounter small showings of oil and gas sufficient to validate the company's tideland drilling permit. The company went too deep after finding primary showings and the hole was lost because of the inability to shut off water. Andrews Oil Co. subsequently endeavored to redrill the hole but after drilling several thousand feet finally wound up within 10 feet of the original hole. Doyle Petroleum Co. erected a derrick 400 feet nearer the tideland and conducted a deep test but failed to encounter any showings of oil or gas. Bolsa Chica Oil Co.'s original test was located at the outer end of a 1,400-foot pier and in view of the failure of Doyle Petroleum to log showings of oil and gas nearer the shoreline it is obvious that any existing accumulation of oil or gas must of necessity be located farther out into the open sea. Bankline Oil Co. is proceeding with its redrilling work on this assumption and will endeavor by directional drilling to place the bottom of the hole approximately 1,000 feet beyond the end of Bolsa Chica's pier. The outcome of work on this well will be watched with considerable interest, because if the Bankline fails to develop commercial production, this possible structure will have been definitely disproved.

Capitan

Shell Oil Co. conducted a preliminary production test on No. 12 Covarrubias in the Capitan field of Santa Barbara County during the early part of the week, but results indicate the probability that further work may be undertaken as the output is cutting approximately 50 per cent. No. 12 Covarrubias, bottomed at 2,600 feet and with the cement job effected at 2,440 feet, was brought in pumping 45 bbls. of 38.6 gravity oil showing the cut mentioned above. The Shell is drilling two other wells on this property and is making preparation to start three additional wells. La Canada Oil Corp. has acquired the Rhode Island estate in section 35-5-30 and rotary equipment has been ordered for the company's initial test in the southwest corner of the section. Operators interested in the Santa Maria district of Santa Barbara County, where Union Oil Co. discovered a new oil field a few months ago, have been marking time, but will probably start additional drilling in the near future. The Union's next test will be drilled on the Enos lease in section 19-10-33 and, while preliminary work was started several weeks ago, drilling operations have been held up in order to enhance the possibility of formulating a drilling program which would preclude intensive development and thus justify economic drilling and prevent the field from disturbing the present artificial equilibrium between supply and demand. Considerable leasing has been undertaken around the Union's discovery well and this activity has even extended up into the southeastern end of the town of Santa Maria. The Union controls a large part of this structure as it is at present believed to exist, but the curtailment committee is anxious to keep conditions well in hand and consequently the Union is cooperating with the committee.

Associated Oil Co. finished a new well in the Ventura Avenue field during the week, but the initial daily production was unsatisfactory. The new producer was No. 98 Lloyd, bottomed at 6,500 feet and finished with a 5¾-inch liner carrying 833 feet of perforated. It was brought in pumping 130 bbls. of 28.9 gravity oil per day, but the output at last reports was still cutting approximately 35 per cent. The Associated, General Petroleum and Shell, controlling all but a very small part of the Ventura Avenue field, have severely reduced development work in this field during the past several months and, while a few additional new wells are being started, it is not likely any aggressive development will be undertaken during the remainder of the year. Operators in this field have sufficient current production from the upper zones to meet the field's allowable daily production for some time, and very little work has been undertaken toward exploiting the deep 57 zone, in which several large producers have been completed. Chanslor Canfield Midway Oil Co. will drill the second test in the Javon field of Ventura County, and it appears probable General Petroleum and Continental Oil Co. will await the outcome of work on this test before undertaking additional development. The Continental has received an extension of its lease, the conditions of which called for the starting of a new well within 90 days after completion of each well, and will therefore retard additional drilling for another several months. This would permit Chanslor Canfield Midway Oil Co. to reach a depth from which correlation work will be possible and some idea gained as to the trend of the structure.

Round Mountain

The Shell Oil Co. added a new well in the Round Mountain field early in the week and should have three more potential producers tanking oil within 10 days. The Shell's new producer was No. 5 Caldwell, section 7-28-29, and the company's potential producers nearing completion are Nos. 4, 11 and 12 on the same property. No. 5 Caldwell was brought in pumping 491 bbls. of 15.6 gravity oil per day from 1,548 feet after the hole had been finished with an 8⅝-inch water string landed and cemented at 1,484 feet and a 6⅝-inch liner landed on bottom. The Shell has decided to pursue an aggressive development program on the Caldwell lease in this field and, in addition to one new rig already erected, the company is building five other derricks and has staked location for another. Barnsdall has a new rig standing for No. 6 Caldwell and Honolulu Oil Corp. with two drilling wells under way is building rig for No. 1 in section 20-28-29. Development work in the Mount Poso field has been showing a declining tendency during the past several weeks and indications point to a lessened amount of drilling during the next 30 days.

The Midway-Sunset field, on the other hand, is showing greatly increased work and drilling operations are expected to show a further substantial gain. During the week Standard Oil Co. put two wells on production in this field and, while both registered commercial production, only one was a new well. This was No. 54-33-D in section 33-32-24, brought in pumping 439 bbls. of 21.3 gravity oil per day from 3,138 feet. Standard No. 24 M.J.M.&M., section 36-12-24, was recompleted pumping 384 bbls. of clean 20.9 gravity oil per day after the hole had been redrilled and deepened to 2,724 feet. The company has two other potential producers under way on this property and they should be finished within a fortnight. Chief Oil Co. No. 1 Francis in section 5-11-23 proved a good well upon completion at 2,655 feet as it was brought in pumping 248 bbls. of 25.6 gravity oil per day. General Petroleum Corp., which completed an unsually large flowing well on its Main Line property a few weeks ago, has already completed a new rig for No. 2 which is scheduled to get under way within another several days. The General Petroleum is also starting three additional wells in this field and this trio is also expected to begin making hole shortly. Ed McAdams, who recently acquired a sublease from Ohio Oil Co. back of Taft in the Midway section of the Midway-Sunset field, has abandoned the hole at 2,000 feet. Upper showings consisted of heavy tar sand and the absence of light oil indications resulted in the stopping of drilling operations.

Kettleman Hills

Two new wells were completed in the Kettleman North Dome field this week and both registered commercial production although each required artificial stimulation. Kenda's new producer, one of the new wells finished this week, was No. 76-30-J, section 30-21-17. It was brought in flowing 1,220 bbls. of clean 36.7 gravity oil per day on a gas lift following completion at 8,240 feet. Kenda is circulating 900,000 feet of gas per day in this well and recovering 1,340,000 feet. Standard Oil Co. completed No. 34-19-J in section 19-21-17, brought in doing 1,588 bbls. of clean 33.8 gravity oil and 1,350,000 feet of gas per day from 8,810 feet. This well was finished with a 5¾-inch liner and to stimulate production kick off valves were placed at 2,500 feet, 3,000 feet, 3,500 feet, 4,500 feet and then at 500-foot intervals down to 7,000 feet where the last valve was installed. Standard No. 38-29-V in the Kettleman Middle Dome field does not look good at 8,828 feet although the company has not shown any indication that drilling operations will be suspended.

Allied Petroleum Corp. No. 18 View in the Mountain View field of Kern County did not have sufficient kick to result in a natural flow upon completion at 5,168 feet and the company was forced to put it on the beam. The initial daily production was 376 bbls. and the oil which was very clean tested 22.9 degrees A.P.I. Hogan Petroleum No. 3 Foster, a recent completion, was a much better well as it was brought in flowing 1,266 bbls. of relatively clean 28.5 gravity oil following the conclusion of drilling operations at 6,049 feet. This well was finished with a 6⅝-inch liner carrying perforations at 5,760-5,821 feet, 5,851-54 feet, 5,876-5,908 feet, 5,918-58 feet and at 5,982-6,030 feet. In addition to the production of crude oil noted above the well is yielding 1,600,000 feet of gas daily. Two good wells were finished in the Kern River field this week and a check of development under way indicates the probable completion of two more within the next few days. Republic Petroleum Co. added another well to its list of producers on the Strassburger lease when No. 8 was brought in pumping 261 bbls. of relatively clean 17.9 gravity oil per day from 2,095 feet after the hole had been finished with an 8⅝-inch liner including 273 feet of perforated. Chanslor Canfield Midway Oil Co. No. 60, section 23-28-27, was finished pumping 166 bbls. of 16.3 gravity oil per day following completion at 2,240 feet. This well was finished with an 8⅝-inch liner carrying 312 feet of perforated landed at 2,212 feet. In the Premier section of the Kern River field Standard finished No. 1 in section 9-28-27 but the well was good for only 120 bbls. of 14.1 gravity oil cutting 10 per cent from 2,850 feet. Dixie Lee Oil Co. No. 3 Seahawk, in the Fruitvale field of Kern County, was completed early this week flowing 131 bbls. of 18.3 gravity oil per day from 3,204 feet. This new well was finished with a 6⅝-inch liner carrying 27 feet of perforated and the output

(Continued on Page 147)

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	May 3		April 26			
	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Intercoastal domestic:						
Diesel and gas oil	.....	.....	.....	.....	151,541	527,098
Gasoline	162,240	23,177	300,285	42,898	2,293,411	2,544,439
Kerosene	.....	.....	.....	.....	505,419	592,040
Foreign exports:						
Crude oil	314,329	44,976	163,779	23,397	3,375,609	3,666,257
Fuel oil	115,910	16,559	328,001	46,857	1,451,338	4,178,377
Diesel and gas oil	72,468	10,353	135,674	19,382	1,696,151	1,385,634
Gasoline	91,915	13,131	19,191	2,742	2,046,702	1,590,092
Kerosene	.....	.....	71,563	10,222	380,593	394,748
Other unfinished oil	.....	.....	.....	.....	13,375	56,161
Coastwise-domestic:						
Crude oil	109,678	15,668	216,216	30,889	2,378,829	2,075,882
Fuel oil	145,983	20,855	193,707	27,672	3,096,301	2,751,458
Diesel and gas oil	17,142	2,449	42,299	6,043	507,701	326,613
Gasoline	327,937	46,848	377,210	53,887	4,750,048	2,943,344
Kerosene	3,584	512	2,209	316	85,379	42,757

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic:						
Diesel and gas oil	.....	.....	.....	.....	.....	157,258
Gasoline	.....	.....	71,960	10,280	71,960	.....
Kerosene	.....	.....	.....	.....	.....	149,715
Asphalt	.....	.....	.....	.....	60,950	71,325
Lubricants	.....	.....	.....	.....	18,129	12,381
Foreign exports:						
Crude oil	85,373	12,196	.....	.....	1,031,374	832,282
Fuel oil	.....	.....	48,512	6,930	1,198,294	565,267
Diesel and gas oil	15,112	2,159	57,032	8,147	302,931	400,802
Gasoline	131,466	18,781	.....	.....	1,119,219	869,910
Kerosene	.....	.....	.....	.....	243,420	216,283
Lubricants	10,130	1,454	.....	.....	100,767	74,411
Coastwise-domestic—						
Fuel oil	215,647	30,807	112,184	16,026	2,711,010	2,381,757
Diesel and gas oil	15,247	2,178	.....	.....	194,950	89,823
Gasoline	86,332	12,190	126,129	18,018	1,622,426	1,447,955
Kerosene	.....	.....	.....	.....	55,772	18,109

Texas and Louisiana Gulf

THREE PROSPECTIVE FIELDS APPEAR OVER THE WEEK END

By
F. L. SINGLETON

HOUSTON, Tex., May 18.—Indications of three oil fields for the Gulf Coast were made by three wildcats two of which are located on the Texas coast in Calhoun and Harris Counties while the other is along the Conroe trend in southwestern Allen Parish, Louisiana.

Amerada Petroleum Corp. and others No. 1 Dopslauf, Satsuma Prospect, Harris County, cored oil sand from 6,789-6,826 feet and on a six-minute drill stem test through a quarter-inch choke tested 60 feet of clean oil and 450 pounds of pressure and casing will be cemented for a production test. Location is in section 2, W.C.R.R. Survey. On the Reeves Prospect in section 28-6s-7w, Allen Parish, Humble Oil & Refining Co. No. 1 J. A. Bell blew out and caught fire when gas sand was cored in the Cockfield horizon at 7,770 feet. The derrick and rig were lost when the hole cratered and the fire was extinguished.

Humble Oil & Refining Co. No. 2 P. H. Welder, located on the Green Lake prospect, northwestern Calhoun County, seemed certain of opening the second oil field for the county as it was cleaning itself through a 9/64-inch choke, making approximately 125 bbls. of fluid per day, of which 30 per cent was oil.

Production

Estimated daily average production by pool in the Gulf Coast Division in the week ending May 16 was as follows:

TEXAS COAST

Field—	Bbls.
Anahuac	8,050
Barbers Hill	17,238
Conroe	46,527
Hastings	6,870
Humble	3,476
Manvel	10,157
Mykawa	3,534
Thompsons	10,694
Greta	16,174
Plymouth	8,897
Saxet	8,934
Saxet Heights	5,974
Miscellaneous	107,154
Total	253,679

LOUISIANA COAST

	Bbls.
Bosco	13,527
Caillou Island	11,450
East Hackberry	8,627
Gillis	16,427
Iowa	19,120
Lafitte	4,850
Lake Barre	9,884
Leesville	15,127
Roanoke	5,534
Sulphur	6,427
Miscellaneous	34,671
Total	145,604
Total Gulf Coast	399,283

Wildcat Abandoned

Mid-Texas Oil Co. No. 1 Security Trust, located in the Willis area, northern Montgomery County, which tested 210 pounds of pressure in top of the Cockfield sand on a drill stem test made last week at 4,250-4,300 feet, cored salt water sand in the Conroe section and has been abandoned at a depth of 4,547 feet. The operators were practically assured of a gas well in the 4,250-foot sand, but as there was no market for the gas it was decided to abandon the hole.

Approximately 1,200 feet west of the discovery of the Amelia field, Jefferson County, Humble Oil & Refining Co. No. 1 Pinchback cored gas sand from 6,731-51 feet and oil sand from 6,751-68 feet, the total depth and 7-inch casing has been cemented preparatory to testing. The Discorbis was topped at 5,502 feet, Heterostegina at 5,885 feet and the Marginulina at 6,030 feet. Based on the latter marker it is approximately 70 feet structurally higher than the discovery well. It is located in the C. Williams Survey and will be the third oil well for the field.

Map shows location of Green Lake Prospect, Calhoun County, and other producing areas in Victoria and Refugio Counties
(Map courtesy of W. W. Zingery, Houston, Tex.)

A second hearing before the Railroad Commission was held at Austin Monday, May 11, regarding spacing rules for the Amelia field and a decision is expected to be rendered within the next few weeks. Humble Oil & Refining Co. and Stanolind Oil & Gas Co., who own considerable acreage in the field, advocated a 20-acre spacing rule which was opposed by numerous town lot owners who are favoring a 1-acre spacing rule.

Salt Dome Oil Co. and Gem Oil Co. No. 2 Lawrence, which appeared several weeks ago as a pool opener for the Cotton Lake prospect, Chambers County, is being abandoned after testing salt water with a slight show of oil when tested through perforated casing at a plugged back depth of 6,650-54 feet. This is the approximate depth from which it was originally completed for an initial production of 20 bbls. per hour, but was drilled deeper to 7,300 feet after production had declined and the well began to make salt water. The operators have abandoned the location for No. 1 A. B. Lawrence, which was made 480 feet east of No. 2 Lawrence and it is understood that a new location will be made to the west about a mile.

Preparations were being made by Atlantic Oil Producing Co. to make a third test on No. 1 Hardy, located 3,600 feet north of the discovery well of the Hardin field in Liberty County. On a drill stem test made last week at 7,980-94 feet, 2,700 feet of salt water was recovered in 15 minutes. Location is in the J. Robertson Survey.

Dickinson Field

At the Dickinson field, Galveston County, Humble Oil & Refining Co. No. 7-B Stewart topped oil sand at 8,015 feet and is bottomed at 8,035 feet and 7-inch casing is being cemented to test. It is 933 feet south of No. 5 in the John Sellers Survey. No. 8-A Stewart is a new location and is situated 883 feet northeast of No. 7 and 408 feet northwest of No. 1 in the John Sellers Survey. In the South extension area, Kenben Oil Co. No. 1 Stewart topped the Heterostegina at 7,197 feet and is drilling in shale below 7,200 feet.

On the west side of the South Houston field, Harris County, Smith and McDannald No. 1 Phillips, located in the center of Block 146, Mary Nicklos Survey, cored oil sand to a depth of 4,780 feet and 7-inch casing has been cemented at 4,640 feet. To the north in Tract No. 24, Stanolind Oil & Gas Co. No. 1 Schwartz is bottomed at 4,775 feet and the hole is being reamed preparatory to running casing.

Orange Field

Texas Canadian Oil Co. No. 1 Bland, located in the Orange field, Orange County, cored from 1,090-99 feet and recovered 3 feet of sand with streaks of shale showing gas, and is coring ahead in gas sand at 7,100 feet. The well is situated on the flank of the dome in the James Dyson Survey and is scheduled to be drilled to 7,500 feet which will be the deepest test drilled. The majority of the wells are producing from 3,000 and 4,000-foot horizons. On the Grigsby prospect, David B. McDaniel No. 1 Nona Mills, located in the E. E. Manuel Survey, is drilling in shale below 6,907 feet with no shows of oil or gas reported. Derrick is being built by Tide Water Oil Co. for No. 1 E. N. Brown, a wildcat test located 550 feet south from the north corner of survey and 1,090 feet at right angles to the northwest line in the May Latham Survey. This company has acquired considerable acreage in this area on the strength of geophysical work done within the past few months.

West of the Withers field, southern Wharton County, Texas Co. No. 1-B Pierce cored sand and shale with a show of oil from 6,107-19 feet and is coring ahead in shale and lime at 6,188 feet. This is the second showing to be encountered, which makes the outcome of the test look encouraging. Location is in the E.T.R.R. Survey. To test east in the Withers field, Texas Co. No. 5-C Pierce was completed at 5,567 feet and flowed 18 bbls. per hour through a quarter-inch choke.

South of the town of Kenney, northern Austin County, W. H. Mitchell and others are moving in material for No. 1 F. Fenner, located in the center of a 28-acre tract in the John Fitzgibbons Survey. A semi-wildcat test for the Livingston field, Polk County, was announced by Hawkeye Petroleum Co. for No. 1 W. F. Harder, located 2 miles northwest of production in the A. Viesca Survey.

Louisiana Coast

Developments along the Louisiana Coast the past week were more or less routine. The most interesting feature was the announcement of four wildcat locations for Calcasieu, Jefferson Davis, East Baton Rouge and Terrebonne Parishes.

On the South Jennings prospect, eastern Jefferson Davis Parish, Stanolind Oil & Gas Co. is surveying location for No. 1 C. E. Britt, which will be located on a 160-acre tract in section 15-10n-3w. It is situated on a block of 6,500 acres which was taken the past year after the company had worked the area with geophysical instruments. Protection acreage is held

Canadian Fields

Completions and Operations in Northwest and in Ontario

By VICTOR LAURISTON

CHATHAM, Ontario, May 16.—Crude deliveries from the Turner Valley field to the Calgary refineries in April totaled 76,615 bbls. compared with 76,687 bbls. in March and a monthly average of 80,710 bbls. in 1935. Receipts of Imperial Oil Refineries, Ltd. in April included 3,959 bbls. of clear naphtha, 662,118 bbls. of discolored naphtha and 2,567 bbls. of crude oil; compared with March deliveries of 3,618 bbls. of clear naphtha, 662,768 bbls. discolored naphtha and 2,538 bbls. of crude. The Bell Refining Co. took 7,971 bbls. in April compared with 7,763 bbls. in March.

Jumping Pound Test Dry

On the Jumping Pound structure west of Calgary, Northwest Co.'s No. 3 Bow River, LSD 6, section 31-24-4w5, finished dry at 1,652 feet and has been abandoned. It got small gas shows at 70 and 1,010 feet. Imperial Oil geologists are locating No. 4 Bow River, which will spud this month. Tentative location for No. 4 was previously made in LSD 2, section 31-24-4w5, but the location will be shifted.

South Turner Valley

In section 21-18-2w5, Union-Freehold Oil Corp. No. 1, LSD 8, is standing 865 feet in the Madison lime and bottomed at 6,462 feet. Production tests after deepening 200 feet indicate naphtha recovery of around 35 bbls. a day. It will probably be given acid treatment. It extends the proven field about a half mile south of the nearest previous producer.

In the same section, Sovereign Royalties No. 1 Myers & Wright, LSD 1, is running casing preparatory to resuming from 2,260 feet. In the southeast corner of the section, Highwood-Sarcee Oils No. 2, LSD 1, has resumed from 4,330 feet.

In section 28-18-2w5, Turner Valley Royalties No. 1, LSD 13, is below 6,350 feet and getting close to the Madison limestone. Location is the farthest west on the South Turner Valley structure and the log indicates comparatively little dip from Century Royalties No. 1 in LSD 14, to the east, which has been one of the best of the recent producers.

Farther north, Sterling Pacific No. 2, LSD 13, section 33-18-2w5, has spudded and is below 60 feet. Location is on the west side of the structure, and the test is being drilled by Royalite Oil Co. which took over the entire section from the Sterling-Sterling Pacific Oil Co. Three producing wells have been drilled on the east side of the section.

High River—Aldersyde

In the High River-Aldersyde area, east of Turner Valley, Arca Development Corp. No. 1, NW section 24-18-1w5, is rigged up. Farther east and north, Ranchmen's Gas & Oil Co. No. 1, LSD 16, section 13-20-29w4, is in a very hard formation below 6,705 feet.

On the New Valley structure, McLeod Oil Co. No. 1 New Valley, LSD 4, section 6-21-2w5, has resumed after running 8-inch casing and is below 4,530 feet. It is planned to carry the present string to 5,000 feet.

In the De Winter area, Wales Petroleum No. 1 Anglesey-Lakeview, LSD 1, section 22-21-1w5, is erecting 136-foot derrick and will install rotary outfit to deepen from 4,500 feet. Walter A. Preston is in charge.

Tests in the Foothills

In the Forest Reserve area west of Olds, Hunter Valley Oil Co. No. 1 McLaren, LSD 12, section 13-31-10w5, is below 5,494 feet.

On the Highwood-Sinclair structure south of Turner Valley, Maple Leaf Royalties No. 1 Banner, LSD 3, section 34-17-3w5, is preparing to run casing to 2,597 feet preparatory to deepening. Casing has been pulled from the abandoned Great West Oils No. 1 deep test on the east side of the Central Turner Valley field. Maple Leaf No. 1 is expected to get a crude horizon about 3,300 feet. Some gas was met in the upper sands.

On the Watson structure, Mar Jon Oil Co. No. 3, LSD 3, section 4-10-2w5, is below 4,210 feet. Mar Jon-Maxmont No. 4, LSD 10, section 20-9-2w5, is unofficially reported to have a small show of oil below 2,100 feet. On the north end of the same structure, Union Drilling Co. of Calgary has resumed work on Raven Oils No. 1, LSD 1, section 20-9-2w5. Water trouble was encountered in the upper horizons and the outfit has been standing at 1,225 feet.

Weymarn Operations

On the Mill Creek structure near Pincher Creek, Weymarn Petroleums No. 2, LSD 5, section 7-6-1w5, is getting ready to resume from 5,668 feet. Announcement has been made by Paul von Weymarn, president and managing director of Weymarn Petroleums, Ltd., that Walter A. Preston, now completing the Anglesey-Lakeview test northeast of Turner Valley, will cooperate financially and technically in completion of Weymarn No. 2. Work will probably resume early in June, the rotary being in charge of John Sherman under Mr. Preston's supervision. The test got fair flows of wet gas in several horizons and shows of light crude approximating a small commercial production; but it will be deepened to the Madison lime before making a definite production test.

Border Fields

On the Del Bonita structure south of Lethbridge, Sunshine Oils No. 1, LSD 10, section 19-1-21w4, has cellar dug and is moving in materials. Rotary outfit from Terminal Oil Co. No. 1 will be moved to location as soon as the latter has been placed on production. The Sunshine location is about a mile north of Terminal No. 1. Sunshine Oils, Ltd. is financed by Vancouver capital and secured its acreage from Lloyd Clinch and Nordon Corp.

Terminal Oil Co. No. 1, H. Orcutt farm, NE section 18-1-21w4, is cleaning out with cable tools and liner in preparation for a production test. The Sunburst sand is gradually cleaning itself out and shows considerable gas pressure and there is a lot of oil mixed with the fluid and cavings.

On the Comrey structure in southeastern Alberta, McDougall-McLeod Oil Co. No. 1, section 9-1-5w4, is deepening after setting 6-inch casing in the Ellis sand at 3,290 feet.

Wellington Oil & Gas Co. and Calmont Oils, Ltd. of Calgary are interested in a new test on the Bow and Arrow structure in northern Montana about three-quarters of a mile south of the Alberta boundary. No. 1 test drilled last year on the dome of the structure was a gasser with flow around 6,000,000 feet a day. No. 2 is being located on the flank of the structure on the Cut Bank contour of production where a commercial flow of crude is looked for in the Cut Bank sands. Production at this point would prove a considerable area on the Alberta side of the boundary.

Wainwright Oil Strike

In the Wainwright field, east-central Alberta, Montreal-Alberta Oils No. 1, LSD 2, section 15-45-7w4 is unofficially reported to have struck a flow of light green crude in the limestone at 3,402 feet. The test, started a couple of years ago, resumed recently from 2,885 feet. It got the Paleozoic lime at 2,321 feet and casing was left at 2,500 feet. Casing will be set on top of the sand and a production test made. The potential flow has been estimated between 50 and 100 bbls. a day. Location is about 3 miles northwest of Wainwright. Operations have been in charge of M. Williamson as field manager, representing eastern Canada capital; and standard tools were used. The reported strike was followed by extensive filing in the adjacent area, over 12,000 acres being leased within the first 24 hours.

British Columbia

Shareholders of Columbia Oils, Ltd. at their annual meeting at Vancouver approved an increase in capitalization to finance completion of Columbia No. 1 deep test on the Sage Creek structure in the southeastern section of the province. The company has been drilling intermittently since June, 1933, carrying the test to 4,836 feet where it shut down last October. Numerous oil shows and considerable gas were encountered.

Gem Dome Test

Equipment is being moved to location for Gem Dome Gas & Oil Co. No. 1 test in section 6-10-29w3, on the Gem Dome structure in southeastern Saskatchewan. Cable tools will be used, and the test will spud some time in June.

Brooks Gas Test

At Brooks, Alberta, the Canadian Western Natural Gas, Light, Heat & Power Co. is digging cellar for a new test for gas, close to the site of the

(Continued on Page 154)

by R. J. St. Germain and the Gulf Oil Corp.

To the southwest on the Hayes prospect, Shell Petroleum Corp. has cemented 7-inch casing on bottom at 9,523 feet in No. 1 Lacassine and is waiting on cement to set. At this depth the well is showing strong gas pressure and the casing was run as a protection string. The hole will be drilled to 9,800 feet, where it blew out several weeks ago, causing the drill stem to stick, which resulted in the hole being plugged back, sidetracked and redrilled. Location is in section 20-11s-5w.

West of the Tepetate field about 2 miles, General Crude Oil Co. No. 1 Vincent in section 31-7s-2w is coring sand with no show below 8,843 feet which apparently defines the field in this direction. Continental Oil Co. No. 1 Johnson topped oil sand at 8,293 feet and is running casing to bottom at 8,317 feet preparatory to testing through perforations.

Roanoke Completions

Two deep producers were added to the Roanoke field in Jefferson Davis Parish. Humble Oil & Refining Co. No. 3 C. N. Taylor in section 12-9s-4w was completed in oil sand at 8,850 feet and flowed 13 bbls. per hour through a three-eighths inch choke with tubing pressure 350 pounds. Oil sand was cored from 8,819-31 feet and 8,833-37 feet and 7-inch casing was cemented at 8,849 feet. In section 12, Shell Petroleum Corp. No. 5 Joseph Kratzer topped oil sand at 8,671 feet and was completed at 8,681 feet for an initial production of 949 bbls. per day through a 14/64-inch choke with tubing pressure 950 pounds and casing pressure 1,050 pounds.

Texas Eagle Oil Co. No. 1 State, which last week appeared to be a possible three-quarter mile north extension to the Cheneyville field in Rapides Parish, made a six-minute drill stem test from 5,693-5,704 feet and showed 2 gallons of water and 5 gallons of distillate. The hole was cored deeper to 5,713 feet and after running an electrical coring test the operators have shut down for orders. Location is in section 5-15s-2e.

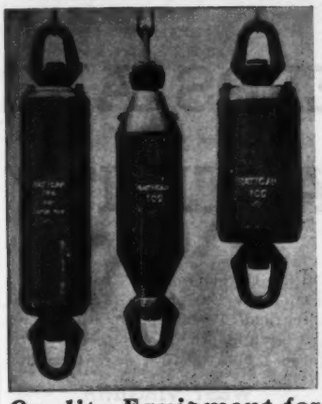
Jeanerette's Fifth Field

Herton Oil Co. is preparing to complete its fifth producer for the Jeanerette field in St. Mary Parish. It is No. 2 Banta in section 40, which topped the oil sand at 6,630 feet and is bottomed in sand at 6,655 feet. No. 3 Banta is coring sand at 6,259 feet and No. 1 Carter, located 1,200 feet east of production in section 38, which missed the 7,500-foot sand, is drilling in shale below 8,300 feet.

At the St. Martinsville field, St. Martin Parish, Continental Oil Co. is preparing to test No. 1 fee, which is bottomed in a sidetracked hole at 7,818 feet. Seven-inch casing was cemented on bottom and a test is to be made of several possible oil sands which were indicated on an electrical coring test. Tide Water Oil Co. No. 2 Smedes in section 57, completed last week for a gas well, started making salt water and the operators killed the well and made a squeeze-out cement job and are preparing to reperforate and test.

In the extreme southeastern part of East Baton Rouge Parish, Cavalier Oil Co. has made location for No. 1 Vignes, located 300 feet south and east of the northwest corner of tract in section 4-8s-2e.

Ratigan Sucker Rod Line Weights



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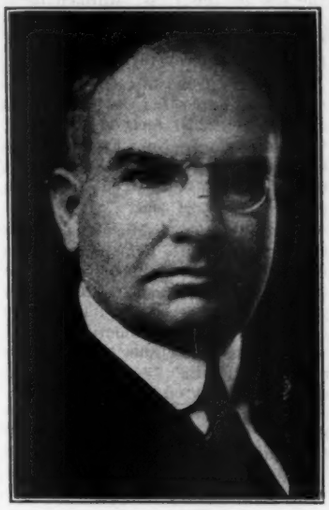
Among Gulf Coast Drilling Contractors

Amos L. Beaty, former president of the American Petroleum Institute, has entered partnership with W. V. Bowles and Victor Howard Borsodi, drilling contractors and independent producers of Houston, and will operate as Beaty, Bowles & Borsodi, Inc., with offices in the Gulf Building.



AMOS L. BEATY

Mr. Beaty will continue to residue in New York and the operating will be in charge of Mr. Bowles and Mr. Borsodi. During the time Mr. Beaty was with the Texas Co. he became acquainted with Mr. Bowles who started to work for the Texas Co. at West Columbia, being promoted from chief scout to general superintendent within a few years. Later Mr. Bowles became associated with Victor Howard Borsodi who developed production around the flanks of the North Dayton field. In 1934 these two operators opened production from the Oligocene in the north part of the Manvel field and have completed a total of five producers.

The partnership was formed as an operating company rather than a contracting company and their first try for production will be started in the near future on the Choclate Bayou prospect in Brazoria County.

M. V. BOWLES

V. H. BORSODI

Rowan Drilling Co. is moving in a rig to Orange County to drill No. 1 E. N. Brown for the Tide Water Oil Co. and others. It is located in the May Latham Survey and will be drilled to approximately 7,500 feet. In the Satsuma area in Harris County Amerada Petroleum Corp. and others No. 1 Dopslauf is drilling below 6,600 feet.

Noble Drilling Co. has reset screen on No. 2 Middleton in the Turtle Bay field for Stanolind Oil & Gas Co. and is preparing to complete. No. 2 State located out in the waters of the bay is drilling in shale below 2,609 feet. In the meantime progress is being made on three holes in the Hastings field for the same company, and two more rigs are located on wildcat prospects in Brazoria and Calcasieu Parish for Strake Petroleum Co.

C. & C. Drilling Co. has abandoned No. 2 Lawrence in the Cotton Lake Prospect in Chambers County for the Salt Dome and Gem Oil Co. and has spudded Dick Schwab's No. 1-A Kirby Lumber Co., a wildcat test located in Polk County.

Nicklos Drilling Co. has cemented 1,500 feet of surface casing in No. 3 Homeseekers in the Tepetate field in Acadia Parish and is drilling below 5,500 feet on No. 2-A Welch for the same company. At the Port Barre field for Pan American Producing Co. No. 2 Cormier is drilling ahead below 2,000 feet.

Rutherford Drilling Co. is preparing to complete No. 1 Langham in the Bay City field for Skelly Oil Co. after perforating casing with 40 shots from 7,460-75 feet. In the meantime No. 7-B Cobb is being rigged up, No. 6-B Cobb is bottomed at 7,261 feet and the hole is being reamed and No. 1 Rugesley is drilling ahead below 7,000 feet.

Ben (Bud) Coyle is preparing to complete his fifth producer for the Herton Oil Co. in the Jeanerette field

(Continued on Page 152)

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Eastern Field Report

By STAFF CORRESPONDENT

LOWER EASTERN FIELDS ARE INCREASING THEIR ACTIVITY

PITTSBURGH, Pa., May 13.—Completions were few in the lower Eastern fields during the past week but the amount of new work starting has greatly improved with some of the larger companies having fair sized programs mapped out. Completions consisted of eight gas wells, two small producers and one dry hole.

Two deep tests in West Virginia were shot and the gas volume was increased considerably. In Malden district, Kanawha County, the South Penn Oil Co. shot No. 2 Katherine C. Scott with 20 quarts and increased the volume from 1,350,000 feet a day to about 4,500,000 feet a day. The Oriskany sand was shot from the top of the gas pay at 4,892 feet to 4,906 feet. The rock pressure at the end of 24 hours was about 1,100 pounds.

In Elk district, Kanawha County, the Columbian Carbon Co. improved the No. 3 G. and D. Copenhaver with a shot and the volume increased from 3,500,000 feet a day to about 5,328,000 feet. This is the fourth good gas well on this farm from the Oriskany sand. The total depth of No. 3 was 5,101 feet and it had a rock pressure of 1,420 feet.

In Elk district, Kanawha County, the United Fuel Gas Co. has made a location for a test on the farm immediately east of the Copenhaver tract and about 1,000 feet east of No. 3. It is on Aarons Fork of Little Sandy Creek and the elevation at the mouth of the well will be 966.71 feet. Here the Columbian Carbon Co. is down 4,938 feet in deepening the test on the W. L. Burdette farm to the Oriskany sand. On the W. H. Baxter and others lease west of Coopers Creek, this company is shut down at 4,719 feet with a fishing job. On the M. M. Robertson farm, which was dry in the Oriskany sand (5,010-42 feet) drilling is being continued down to the Newburg sand and the present depth is 5,111 feet. On the Elkland Improvement Co. farm their test is drilling at 4,506 feet.

In this district, V. C. Smith and others have reached 5,538 feet deepening the test on the island at the mouth of Coopers Creek. The Yoak Oil & Gas Co. has reached 1,355 feet on the W. T. and J. H. Goshorn farm and Benedum & Trees are down 1,259 feet in the second test on the Mary C. Wingfield farm. The Glen Oil & Gas Co. is drilling at 1,510 feet on the Virginia Joint Stock Land Bank (Charles L. Morris) farm.

In Malden district, Godfrey L. Cabot, Inc. has five deep tests drilling. No. 9 Campbells Creek Coal Co. is down 4,010 feet and No. 10 is at 2,530 feet. On the William Tompkins heirs farm No. 2 is drilling at 440 feet. The second test on the Nellie B. Tompkins farm is down 1,405 feet. On the W. D. Lewis farm, Cabot is shut down at 4,300 feet cementing a cave. The United Fuel Gas Co. has started building road to the location for a test on the George Creek Land & Mining Co. tract.

In Big Sandy district, the United Fuel Gas Co. is moving in material for a well on the L. D. Updegraff farm. In Loudin district, the United Carbon Co. is drilling at 5,003 feet in the test on the C. C. Dickinson farm and the Oriskany sand should be drilled through within the week. Godfrey L. Cabot, Inc. is drilling at 2,915 feet in the second test on the Kanawha Land Co. lease.

SOUTHWEST PENNSYLVANIA

Completions in southwest Pennsylvania consisted of two gas wells. In Morris Township, Washington County, A. V. Lewis and others completed the test on the D. L. McVey farm at a total depth of 3,032 feet as a gas well gauging 650,000 feet a day. The Fifty Foot sand was at 2,776-2,825 feet with about 37,000 feet of gas showing at 2,788 feet. The Fourth sand was at 3,018-19 feet with the large volume of gas showing at 3,019 feet.

In Richhill Township, Greene County, the Natural Gas Co. of West Virginia drilled deeper on the Sherman Braddock farm to 2,604 feet. The Fifty Foot sand was at 2,293-2,307 feet with about 368,000 feet of gas at 2,296-99 feet which blew down to 75,120 feet.

Equitable Gas Co. has started an extensive program of new work in Greene County. In Whiteley Township, this company made a location for a test on the Elizabeth Johnson farm on Lantz Creek. It is hauling in a rig for a test on the George Hennen farm, same township. In Monongahela Township, this company is moving in on the Mestrezar farm and has made a location on the A. G. Mundell farm and is hauling in materials. In Perry Township, this company is moving in rigs for tests on the Mary B. Haines farm and the George W. Craig (Morgan Wade) farm. In Jackson Township, this company has also made a location on the S. B. Henderson, and is building a rig on the B. R. Lemmon farm. In Greene Township, the same company is building a road to a location on the A. R. Core farm. In Wayne Township, it is hauling in rig materials for a test on the Mathias Brant farm.

In Richhill Township, Greene County, Lewis & Co. have resumed drilling the test on the Samuel Chess farm and have reached 1,955 feet. In Springhill Township, the Dunn Mar Oil Co. has spudded in and started drilling the No. 4 on the David Hostutler farm. In Center Township, the Carnegie Natural Gas Co. has the rig on the ground for the test on the J. W. Milliken farm. In Center Township, the South Penn Oil Co. is down 2,200 feet on the Charles T. Harvey farm.

In Morris Township, Greene County, the Equitable Gas Co. has reached a depth of 2,250 feet on the J. M. Clutter farm. In New Freeport, this company is testing No. 1 Fannie Berdine farm at 3,025 feet. It had a small showing of gas.

In Amwell Township, Washington County, the South Penn Oil Co. has reached a depth of 1,950 feet on the Anna A. Lowery farm, 1,020 feet on the Hazel M. Seese farm and 1,000 feet on the J. Q. Zimmerman farm. A. V. Lewis and others spudded in and are running 13-inch casing in the second test on the Anna Chambers Phelan farm. The Union Gasoline & Oil Corp. is drilling at 2,140 feet on the Marion C. and Nettie Johnson farm.

In South Franklin Township, the Carnegie Natural Gas Co. has spudded in and started drilling the test on the Belle A. Jones farm. In East Finley Township, the Natural Gas Co. of West Virginia is drilling at 800 feet on the J. R. and Lillian Day 80-acre farm near East Finley. The Manufacturers Light & Heat Co. is rigging up the test on the A. J. Sanders farm.

In Deemston Township, Washington County, Otto Keys has spudded in and started drilling the test on the Mordica McCarty farm.

In Beaver County, C. E. Bartley is drilling a test on the John Nelson farm in Greene Township and has reached a depth of 700 feet.

In Allegheny County, O. Miller has a rig standing for a test on the McClay heirs farm in Hampton Township. In this township, E. A. Bream & Co. have a rig standing for No. 7 on the Wallace heirs farm.

Deep Tests

Norwood Johnston and others have reached a depth of 3,300 feet in the deep test on the James McBurney farm south of Hickory in Pleasant Township, Washington County.

In South Union Township, Fayette County, the deep test of William Snee and others on the Summit Hotel property on Chestnut Ridge made no hole during the week. It was bridged over with cement at 4,000 feet and this is being drilled out preparatory to rerunning casing down to the bottom or 6,270 feet.

SOUTHEAST OHIO

Only two completions were reported from southeast Ohio. In Knox County, Davis, Stout and others completed a test on the Grover farm in Morgan Township in the lime at a depth of 1,790 feet. It is a gas well gauging 100,000 feet a day.

In Medina County, the Litchfield Oil & Developing Co. completed a test on the Earl Hines farm, Lot 45, Litchfield Township, in the Berea grit at a depth of 463 feet. It produced 1 bbl. the first day after shot.

WEST VIRGINIA

Only one producer was completed in West Virginia. In Hancock County, the R. J. Braden Co. completed No. 23 on the Hewitt heirs farm on the Ohio River in Grant district in the Berea sand and it is starting off at 5 bbls. a day.

Gas Wells

In Boone County, the Pure Oil Co. completed No. 79 Federal Coal Co. tract in Sherman district in the Berea sand at 2,972 feet. It is a gas well gauging 150,720 feet a day. This company is drilling the No. 81 at 1,012 feet.

In Cabell County, three gas wells were completed. In McComas district, the Hillcrest Gas Co. completed the test on the J. Albert Gill farm at a depth of 1,560 feet and it gauges 2,277,000 feet a day. The Big Lime was at 1,325-1,485 feet; the Big Injun sand was at 1,554 feet with the gas showing at 1,555-60 feet. The West Virginia Gas Co. completed No. 2 on the Elmer Gill farm in the same formation at a depth of 1,440 feet. It gauges 1,250,000 feet a day with the Big Lime at 1,215-1,375 feet and the Big Injun sand at 1,435 feet and gas at 1,438-40 feet.

In Guyandotte district, Cabell County, the Eureka Gas Co. completed a well on the Hans-Watts Realty Co. tract at a depth of 2,856 feet. Here, the Big Lime was at 1,163-1,296 feet; the Big Injun sand at 1,328-1,432 feet; the Berea sand at 1,949-64 feet; the Brown shale at 2,395-2,844 feet with about 268,000 feet of gas at 2,514-30 feet.

In Kanawha County, the Winifred Coal Co. completed No. 19 on its own property in Loudin district in the Weir sand at a depth of 2,051 feet. It is a gas well gauging about 70,000 feet a day.

In Roane County, L. L. Reed and others drilled a test on the B. F. Winters farm in Harper district through the Salt sand to a depth of 1,695 feet. It was a dry hole.

Other Operations

In the McComas district, Cabell County, the Gilbert Gas Co. is rigging up on the Gilbert Holton farm on Reuben Branch; Adkins and Morris are rigging up on the Caldwell heirs farm on the Guyandotte River, and Fairfax Gas Co. and others are deepening the test on the Leonard Paugh farm and have reached 4,120 feet and are shut down fishing the bailer. In Barboursville district, the Merritts Creek Gas Co. is rigging up on the David Gideon farm on the

(Continued on Page 145)

North Louisiana, Arkansas

By H. STANLEY NORMAN

COOPERATIVE STATE ACTION SOUGHT IN RODESSA FIELD

SHREVEPORT, La., May 19.—With upwards of 30 tests projected for immediate drilling on the Cass County, Texas, side of the Rodessa Pool, cooperative control of production from the bi-state field has reached a point which can be overlooked no longer by regulatory bodies of Texas and Louisiana.

The latest invitation from the Texas Railroad Commission to the Louisiana Department of Conservation for a joint conference on Rodessa conditions has been accepted by Dr. J. A. Shaw of this state.

In a telegram last week to the Texas Railroad Commission, Doctor Shaw, director of the Louisiana Department of Conservation, accepted the invitation to deliberate the Rodessa situation "any time after next Wednesday" (May 13).

Although its production volume has been normal for a Rodessa field completion, the fact that American Liberty Oil Co. No. 1 Rambo, 4 miles southwest of previously proven acreage, made a gas and oil producer, has touched off a drilling program which may outrank that of the past in Caddo Parish, Louisiana.

Gas Line for Fuel

In anticipation of the heavy drilling program to follow the American Liberty company's extension, United Gas Public Service Co. is making preparations to immediately construct about 4 miles of 6-inch gas line from the James Young Survey southwest into the heart of the Cass County territory to be placed under development. The United company's gas line extension will supply fuel to drilling wells in the territory at a flat rate of $2,500 per well. In addition to serving fuel requirements of outside operating concerns, United is the chief acreage owner in the Cass County territory now regarded virtually proven by the American Liberty No. 1 Rodgers on the north in the C. M. Robinson Survey and by the same company's No. 1 Marcus Rambo in the J. H. Rives Survey on the south.

United Gas Public Service Co. and R. W. Norton (Magnolia) own nearly 90 per cent of the leases between the two outpost American Liberty company producers and the main portion of the Rodessa pool.

Bossier Parish, Louisiana

United Gas Public Service Co. No. 1-A A. J. Murff, 1,320 feet south and 50 feet east of the NW cor. of section 17-17-11, was completed for 41,500,000 feet of gas, with 2,160 pounds rock pressure after plugging back from 5,409 to 5,135 feet. Elevation is 202 feet and 7-inch casing was set at 4,930 feet.

Caddo Parish, Louisiana

S. P. Borden No. 1 K. C. S. Railroad Co., 70 feet south and 1,059 feet east of NW cor. SW section 23-23-16, gauged 260 bbls. of oil in nine hours through a quarter-inch choke against casing pressure of 750 pounds and tubing pressure of 225 pounds. The well is completed at 6,008 feet with top of saturation logged at 5,990 feet.

J. Edward Jones No. 1 Ashley, C Lot 6, Block 13, section 22-23-16, flowed 119 bbls. of distillate in 19 hours through five-sixteenths inch tubing choke. Top of oil and gas saturation was 5,995 feet and the hole is bottomed at 6,013 feet.

C. G. Gibbons No. 1 Morgan, 800 feet south and 1,200 feet west of NE cor. section 15-21-16, was abandoned a failure at 1,921 feet where salt water appeared with a slight showing of oil. W. F. Lacy No. 1 Tyson, 789 feet west and 233 feet south of of NE cor. SE NW section 24-23-16, flowed 7 bbls. of distillate per hour with 10,000,000 feet of gas through a quarter-inch choke at total depth of 5,997 feet. Tubing pressure was 1,700 pounds and casing pressure was 2,050 pounds.

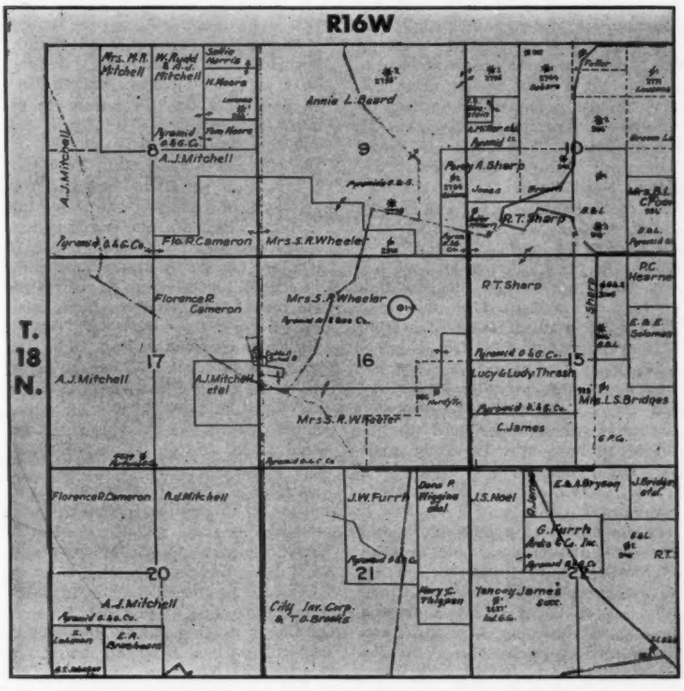
George Manahan No. 1 T. M. Comegys, C SE NE SE section 10-23-16, averaged 50 bbls. of oil per day during April at plugged back total depth of 5,905 feet. The hole was originally carried to 6,026 feet and was then plugged back by stages.

John Thompson and Ralph Bristol (M. H. Marr and others) No. 5 Hunter, 990 feet south and 1,316 feet east, NW cor. SW section 13-23-16, flowed 10 bbls. of oil per hour through three-sixteenths inch tubing choke at completion depth of 6,078 feet. Top of saturation was 6,030 feet and 7-inch casing was set at 6,062 feet.

R. W. Norton (Magnolia) No. 2 Atkins unit, 170 feet south and 330 feet west of NE cor. section 18-23-15, was completed for 10 bbls. of oil per hour flowing through a quarter-inch tubing choke at total depth of 6,040 feet. Top of saturation was logged at 6,003 feet and 6⅝-inch pipe was landed at 6,006 feet. Tubing pressure is 925 pounds and casing 950 pounds.

R. W. Norton (Magnolia) No. 4-A Caddo Levee Board, 660 feet south and 1,980 feet west of NE cor. section 21-23-16, flowed 35 bbls. per hour through one-eighth inch tubing choke on completion at 5,992 feet. Elevation is 197 and 7-inch casing was landed at 5,971 feet.

Standard Oil Co. of Louisiana No. 3-A Mattie L. Pitts, 284 feet north and 330 feet west of SE cor. SE SW section 11-23-16, gauged 84 bbls. of oil per hour through 1¾-inch tubing choke from saturation topped at 6,021 and drilled to 6,033 feet, total depth.



Closely watched wildcat area where the Pyramid Oil & Gas Co. and United Gas Public Service Co. No. 1-A Wheeler cored ahead below 5,020 feet in western Caddo Parish, Louisiana

(Courtesy Globe Map Co., Shreveport, La.)

Standard of Louisiana No. 1 S. G. Zylks, C SW SW SW section 10-23-16, is credited with 80 bbls. per hour through 1¾-inch tubing choke on completion at 6,000 feet, but on the latest gauge made 210 bbls. in 12 hours with 11.5 per cent water.

United Gas Public Service Co. No. 4 Thomas Unit, C NW NE NW, section 23-23-16, flowed 72 bbls. of oil per hour through one-half inch tubing choke from 6,021 feet total depth. Top of saturation was 5,966 feet.

Estimated Production

Estimated daily average production in North Louisiana and Arkansas for the week ending Saturday, May 16, was as follows:

NORTH LOUISIANA

	Bbls.
Bellevue	455
Caddo Light	3,975
Caddo Heavy	2,485
Converse	1,120
Cotton Valley	420
De Soto and Red River	1,320
Elm Grove	485
Haynesville	3,410
Holly	145
Homer	2,650
Pleasant Hill	160
Rodessa	61,330
Sarepta-Carterville	425
Urania	2,890
Zwolle	1,265
Total	82,535

ARKANSAS

	Bbls.
Champagnolle	3,220
El Dorado	2,105
Lisbon	295
Miller County	1,020
Nevada	865
Smackover Light	3,140
Smackover Heavy	17,805
Stephens	565
Urbana	1,945
Total	29,960

Texas side Rodessa field, 2,125 bbls. daily.

Claiborne Parish, Louisiana

Triangle Drilling Co. and Standard of Louisiana No. 1 Kilpatrick, C SW NE of section 7-19-5, an old well drilled deeper, gauged 4,968,000 feet of gas per day at 5,811 feet and with 7-inch pipe cemented at 5,407 feet.

DeSoto Parish, Louisiana

A. G. Holbach and others No. 1 Staten, SW cor. SE section 29-13-14, was abandoned dry at 4,003 feet.

Morehouse Parish, Louisiana

John E. Farrell No. 15 State, 1,208 feet south and 68 feet west of NE cor. of section 28-21-4e, gauged 6,000,000 feet of gas per day from total depth of 2,135 feet. Rock pressure is 765 pounds and 6-inch pipe is cemented at 2,065 feet.

John E. Farrell No. 17 State, 1,262 feet north and 1,739 feet east of the SW cor. of section 33-21-4e, gauged 11,000,000 feet of gas per day against rock pressure of 865 pounds from total depth of 2,135 feet. Six-inch casing is cemented at 2,070 feet.

Sabine Parish, Louisiana

Posey Sisters Oil Co. No. 1 Looney, NE cor. SW SE NE section 10-9-13,

pumped 20 bbls. per day on completion at 1,792 feet after the shallow pay was treated with acid.

Union Parish, Louisiana

Carbons Consolidated No. 1 Bird, 1,087 feet north and 968 feet east of SW cor. SE quarter section 27-22-3e, gauged 1,000,000 feet of gas daily with 900 pounds rock pressure on completion at 2,185 feet.

New Deep Structure

Another deep structure in North Louisiana was proven last week for gas production, but the limited volume and absence of oil was disappointing to some degree. The new gas discovery is in Webster Parish southeast of Sibley.

Although estimates on gas production ranged from 2,000,000 to 15,000,000 feet per day, the Webster Parish discovery had failed to show sufficient pressure and volume for continuous, steady production of either gas or distillate. However, it was regarded probable that J. P. Evans and others of Shreveport, drillers of the Webster Parish wildcat on the Crichton land in section 35-18-9, will carry the hole below its present depth of 5,532 feet to fully explore the structure's possibilities. The Pyramid Oil Co. (Belchic & Laskey) and United Gas Public Service Co. No. 1-A Wheeler, western Caddo Parish wildcat test northwest of Cross Lake, remained the focal point of North Louisiana's most active lease play during the past week. Pyramid and United are withholding detailed information on the No. 1-A Wheeler, which is in section 16-18-16, but operators are reported to have ordered casing after encountering additional evidence of porosity in Trinity-age lime below 5,150 feet. More than 500 acres of leases and numerous royalty interests in the vicinity of the Pyramid wildcat test changed hands last week mostly on a basis of $75 to $100 per acre.

Gulf Refining Co. continues to add to its block on the south shore of Cross Lake in western Caddo Parish and J. E. Smitherman filed leases last week on approximately 1,000 acres in his block centering on section 12-15-12, in southern Caddo Parish. Numerous independents are trading in the Cross Lake district on strength of the rumors that Gulf's shooting parties mapped a structure with considerable closure.

United Gas Public Service Co. purchased protection around the new Kennowood Pool Co.'s wildcat test in western Caddo Parish which is scheduled to test the Trinity-age lime and equivalent horizons.

Rodessa Development

The completion rate in the Rodessa pool of Caddo Parish continued unabated with 10 new oil, gas and distillate wells finished by various operators. Standard Oil Co. of Louisiana and Gulf Refining Co., R. W. Norton (Magnolia) and United were the leaders each with two or more completions.

United Gas Co. plugged back and completed its No. 1-A Murff in Bossier Parish for a large gas well. The deep Trinity producer, in section 17-17-11, was originally drilled to 5,409 feet and operators plugged the hole back to 5,135 feet where it was completed for 41,500,000 feet of gas per day with 2,160 pounds pressure. Seven-inch casing was set and cemented at 4,930 feet.

The deepest test ever drilled in the North Louisiana, South Arkansas and far East Texas district, Ohio Oil Co. No. 5 R. L. Holloway, in section 28-21-10, Webster Parish, on flank of the Rainbow pool, continued coring and drilling last week below 7,500 feet. The test may be carried to the Permian lime which was proven productive on flanks of the Smackover pool in Ouachita County, Arkansas, by Phillips Petroleum Co. At least it will thoroughly test productive prospects in the Trinity section's basement sands. Operators are withholding all pertinent information on the deep test, but the impression is abroad that encouraging features have been encountered.

Central West

Operations in Central Ohio, Kentucky, Illinois, Indiana

By GEORGE A. WHITNEY

FINDLAY, Ohio, May 18.—Only a few completions were reported during the past week in the Central West area, and those that were drilled in were rather small in both oil and gas.

In Starke County, Ohio Fuel Gas Co. No. 4 Eliza Harmount, section 22, Jackson Township, made a light gas showing and was abandoned. Same company has a location for No. 5 on the same farm. Same company is drilling No. 4 A. J. Stoner, section 3, same township, and has a location on the Joseph Forney farm, section 21. Sugar Creek Township. In Perry Township, White & Lyons' No. 2 Jacob F. Hess, section 2, is a gas well at a total depth of 4,444 feet. Lyons & Co., drilling No. 1 Homer E. Snyder, section 11, and is drilling No. 1 Fashnacht farm, section 11, and No. 1 on the Ellen Bergen farm, section 11. In Jackson Township, Ohio Fuel Gas Co. No. 4 Eliza Harmont, section 27, was plugged at 4,382 feet. No. 5 is a location.

In Ashland County, the Ohio Fuel Gas Co. No. 1 Talbot, section 18, Jackson Township, produced an initial of 26 bbls. at a depth of 2,663 feet. Same company is drilling No. 3 Stoner, section 3, and No. 1 Mary Stanislawski, section 33.

In Hardin County, McCaubry and others are drilling a test on the John B. Shedley heirs farm, section 11, Marion Township. In Pleasants Township, Kenton Oil & Gas Co., drilling No. 2 F. E. Hamilton, section 17, and Waltermire Co. has a rig up for No. 1 J. H. Ziegler, section 18, same township, and Donnelson & Co. has rig up on the F. and M. Jones farm, section 20, same township and county.

In Logan County the Jack Center Oil & Gas Co. is drilling a test on the Very Hardon farm, in Stokes Township.

In Seneca County, R. E. Greene is drilling No. 3 Schaull, section 30, Liberty Township. Tiffin Independent Gas Co. is drilling No. 3 on the Frank Sherger farm, section 30, same county. J. L. Barrett is drilling No. 1 on the T. N. Einsel farm, section 1, Hopewell Township.

In Sandusky County, Homer E. Keiser is drilling No. 17 Homer Russell, section 8, Jackson Township. In Scott Township, Klingberg & Co. is drilling No. 2 Edward Bowe, section 18, and Montgomery & Co. are drilling No. 2 N. T. Hetrick, Rice Township.

In Wyandot County, Strouse & Co. has a rig in for No. 1 on the Fred Mozier farm, section 7, and the Cherokee Oil Co. is drilling No. 1 on the McKelvey Smalley farm, section 3. In Pitt Township, Wood & Co. are drilling a test on the Edward Orton farm, section 22, and Dempsey & Co. drilling No. 1 on the S. P. Cooper farm, section 32, same township.

In Tuscarawas County, Mike Hardwick is drilling No. 2 on the Larson B. Zimmerley farm, Lot 21, Sandy Township. J. N. Harper is drilling No. 1 on Oscar Kohler, Lot 19, and the East Ohio Gas Co. has a rig up on the Charles A. Lebold farm, Lot 3-4, same township.

In Holmes County, Ohio Fuel Gas Co. No. 1 Phillip Mizer, is a gas well at a depth of 4,032 feet and in section 26, Paint Township, the company has a location on the Moses S. Miller farm, section 29. In Ripley Township, Ohio Fuel Gas Co. has a rig up on the Thomas L. Hughes farm, section 34.

In Summitt County, East Ohio Gas Co. No. 1 on the M. Krasinski farm, section 19, Greene Township, is a gas well at a depth of 4,029 feet. Same company is drilling No. 1 on the Rosa Lamb farm, section 17, same township. Brooks Johnson is drilling No. 1 on the F. and J. Bowman farm, section 17, Twinsburg Township, same county.

In Coshocton County, M. O. Waltz No. 3 Jesse Lawrence, section 4, Clark Township, produced 3 bbls. initially from Berea sand at 810 feet. Preston Oil Co. is drilling No. 4 Mossholder, Lot 34, Newcastle Township, and made location for No. 3 on the A. and J. Beatty farm, Lot 3, same county. In Jefferson Township, same county, C. C. Moore is drilling No. 1 J. Lee Ketilla, Lot 20. Hulse-Kundtz, Inc. is drilling No. 3 Dawson, Lot 17, Perry Township. Ohio Gas Light Co. is drilling No. 2 Storm farm, section 10, Mill Creek Township. Ohio Fuel Gas Co. has a location staked for No. 1 Crowl, section 2, Bethlehem Township.

In Fairfield County the City Natural Gas Works is drilling No. 3 Rufus Conrad, section 34, Berne Township; No. 2 Fred Crile farm, section 22, and No. 1 Matilda Bauer, section 27. In Rush Creek Township, same company is drilling No. 1 W. C. Mossberger farm, Lot 31, and the No. 1 C. Stalder farm, Lot 31, and rig is up for No. 1 D. Stalder farm, Lot 39.

KENTUCKY FIELDS

In McLean County, in the Livermore area, the Sunflower Oil & Gas Co. No. 5 on the Shockley Brothers

(Continued on Page 154)

Slightly Disappointing

Although Phillips Petroleum Co.'s deep Permian discovery on the northeast edge of the Smackover pool in Ouachita County, Arkansas, has been slightly disappointing in that it performs irregularly in producing oil, the area is just now coming in for major attention. The Phillips company has opened an office at El Dorado, Ark., headed by Warren Weeks, district geologist, transferred from Shreveport. John Alban is head of the land department and L. W. Alexander has been assigned to the land scouting department.

The Phillips company is drilling three tests, Standard Oil of Louisiana has started one and Lion Oil & Refining Co. has one test in process of starting surrounding the discovery well. Delta Drilling Co. and Edwin Jones abandoned location for their No. 1 Calion Lumber Co., in section 22-15-15, Ouachita County, Arkansas, a half mile from the Phillips discovery producer, but no reason was assigned for adopting option to delay drilling. The Phillips company is reported to have moved eight shooting trucks into the district and to be planning extensive detail work on its leases on nearly 200,000 acres in Ouachita, Ashley, Bradley and Union Counties, Arkansas.

Companies which had not purchased protection in the general area, extending from the Smackover pool southeast to the Monroe gas field in North Louisiana, were active last week acquiring leases and royalty. One of the most active areas in southern Arkansas is in Lafayette County where Superior, Tide Water, Sun, H. L. Hunt and others are acquiring leases and royalty buyers are purchasing mineral interests north of the Joe Modisette test in section 21-19-24, which is now drilling below 5,900 feet, but considered definitely off structure.

It is reported from Fayetteville that Darby and Shell have been assigned approximately 25,000 acres in Crawford, Sebastian, Johnson and Franklin Counties, Arkansas, at nominal wildcat prices.

In Bienville Parish, Louisiana, Gulf continued leasing around section 22-14-7, southeast of Castor, and the Texas Co. purchased a checkerboard play southwest of Mount Lebanon in Township 17, Ranges 7 and 18. The Texas Co. also purchased a spread around the Rondeau block and test in section 9-15-10, Bienville Parish.

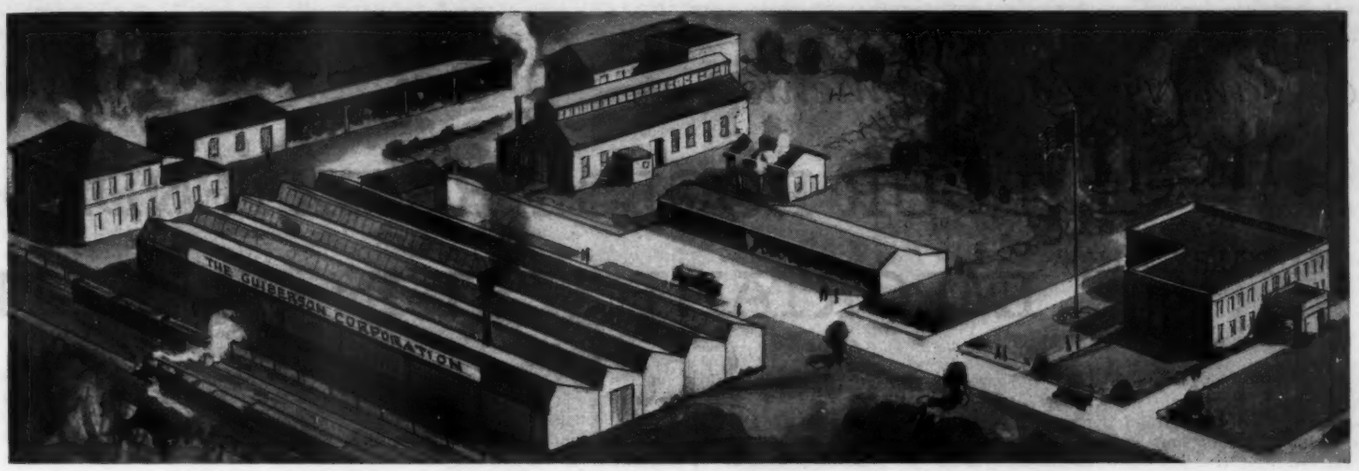
Gulf is reported to have leased about 900 acres in Township 20, Range 2, Winn Parish. Shell and the Texas Co. are the most active in the old Homer district of Claiborne Parish, purchasing acreage as protection against deeper exploration.

Ouachita County, Arkansas

Delta Drilling Co. No. 1 Calion Lumber Co., SE SE section 22-15-15, is an abandoned location and operators will not drill the test.

Union County, Arkansas

Mrs. R. K. Jones and others No. 1 J Davis, C SE NW NW section 28-16-14, has been abandoned at 3,297 feet and operators have elected not to fulfill deepening program.



Artist's drawing of the Main Offices and Plant of The Guiberson Corporation, Dallas, Texas.

GUIBERSON'S CONTRIBUTION TO OIL INDUSTRY EFFICIENCY

The Guiberson Corporation has been more than just a manufacturer selling to the oil industry. So basic and important has been the service to the industry performed by many patented Guiberson specialties, and so universal has their use become among oil operators, that the history of the Guiberson Corporation is part and parcel of that of the oil industry itself. The automatic tubing catcher, the tool joint, the spiral bottom water plug, the flexible-cup swab, are today as much a part of standard drilling and producing equipment as are the derrick and the drill pipe.

The origin of the Guiberson Corporation may be rightfully fixed at the time Mr. S. A. Guiberson, Jr., entered into an agreement with W. H. Mills, of Coalinga, California, for the manufacture of what was later known as the Guiberson Casing Tong.

A short time thereafter Mr. Guiberson took over the exclusive rights, outside of California, for the Baker Casing Shoe.

In 1913 he entered into an agreement with L. L. Richard for the exclusive rights on his invention, the Automatic Tubing Catcher.

Then followed his agreement with W. H. Whittier, who invented the Rotary Tool Joint.

These four famous tools formed the nucleus for the business which later developed into the Guiberson Corporation, erected a modern manufacturing plant at Dallas, and enlisted the services of Mr. Guiberson's two brothers, N. G. Guiberson and W. R. Guiberson, his brother-in-law, R. S. Haseltine, and his two sons, Allen Guiberson and Gordon G. Guiberson.

Tools in World-Wide Demand

The Guiberson Corporation has specialized in the introduction and manufacture of patented tools designed to increase the efficiency of oil field operations. In the years which followed incorporation many valuable patented tools were introduced, among which the most notable has been the flexible-cup swab. This swab revolutionized swabbing practice, and like the Guiberson Tubing Catcher, the Tool Joint, and other Guiberson specialties, it rapidly achieved a world-wide market. Other important members of the Guiberson family of tools are the Guiberson Control-Head Packer, the Guiberson Spiral Bottom Water Plug and Tubing and Casing Packers, the Guiberson Disc Bit, the Guiberson Underreamer, the Guiberson Tubing and Wire Line Oil Savers, and—very recently—the Guiberson Tubing and Casing Spiders, Tubing and Sucker Rod Strippers, and High-Pressure Oil Saver.

The last-named product—the Guiberson High-Pressure Oil Saver—is proving to be of great value for tubing and drilling wells under pressure, and though introduced only a few months ago it is already enjoying a wide demand. Other new Guiberson tools in demand and use are the Guiberson Sucker Rod Stripper, the Guiberson Type B Tubing Oil Saver, and the Guiberson Floor Block.

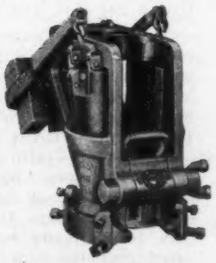
Company Keeping in Step with Latest Oil Field Practices

As a result of its many years of experience in producing high grade oil field tools, the Guiberson Corporation has developed the highest standards of precision manufacture. As the oil companies have progressed in engineering development and in their demand for efficient tools, the Guiberson Corporation has been likewise progressive. Every tool is not only manufactured by precision methods, but it is then thoroughly tested with modern testing equipment before leaving the shops. As a result, Guiberson tools have gained a world-wide reputation for quality and performance. The Guiberson Corporation takes pride in the fact that it has kept abreast of the times in modern factory machinery and workmanship, in engineering ability, and in maintaining the highest standards of service to the trade.

In line with its familiar slogan, "Better Be Safe Than Sorry", the Guiberson Corporation's policy is to make available to the Oil Industry, tools which will increase the safety and efficiency of production methods. For information on any Guiberson product, address The Guiberson Corporation, Box 1106, Dallas, Texas, or Guiberson branch offices located in Tulsa, Oklahoma,—Wichita, Kansas,—Houston, Texas,—Newark, Ohio,— or Los Angeles, California.

SOME MAJOR PRINCIPLES PIONEERED BY GUIBERSON

Tubing Catcher



Tubing Spider with Guide Head

Spiral Plug

High-Pressure Tubing Oil Saver

Control-Head Packer

Type C Sucker Rod Stripper

Flexible Swab

Kansas Developments

By
DAL DALRYMPLE

FOUR POOLS ARE EXTENDED; IMPORTANT TEST IN GRAHAM

Extensions of the Lerado and Haven areas of Reno County, the Bemis sector of Ellis County, and the Graber pool of McPherson County were indicated by favorable showings in interesting Kansas tests the past week. Russell, Rice and Barton Counties accounted for their customary number of completions, with several more good producers being completed in the Silica field.

Location has been made and work was due to start by June 1 on a wildcat well in southeastern Graham County that will be closely watched by the Kansas oil fraternity. It is the Noah & Young No. 1 Hiram Hills, SE cor. section 19-10-21w, about 7 miles northeast of the Wakeeney pool in northern Rooks County. The geology is by P. W. Anderson of Wichita. It is to be a Siliceous lime test. Twin Drilling Co. has the contract, and rig is being built. Fred A. Noah and Frank R. Young, the operators, have an 8,500-acre block in Graham County, and four additional tests are expected to be drilled soon around the block.

Shell Petroleum Corp. No. 1 Whipple, NW section 14-26-9w, one-half mile southeast of production in the new Lerado pool, made potential of 2,348 bbls. after acidizing. Total depth is 4,141 feet in Viola lime. Marathon Oil Co. No. 1 Decker, SW SE SE section 20-21-1w, three-fourths of a mile northeast of the Graber pool in McPherson County, topped Hunton lime at 3,285 feet and had a showing of oil. Casing was being set preparatory to drilling into the formation. It is one-half mile north and one-fourth mile east of the nearest production in the Graber area. Winkler & Koch and others No. 1 Hadley, NE NW section 21-11-17w, one-half mile west of the Bemis pool in Ellis County, topped Siliceous lime at 3,344 feet, total depth 3,354 feet, and had a good showing of oil. Casing was being cemented.

Rice County

Mid-Continent Petroleum Corp. No. 3 Risse, NW SE NE section 6-20-10w, in the Rice County sector of the Silica field, was the largest of several good producers completed in that county the past week. It topped Siliceous lime at 3,292 feet, drilled to 2,299 feet, total depth, and made potential of 1,933 bbls. of oil in 24 hours after acid treatment. Gulf Oil Corp. No. 1 Knop, SW NW NW section 33-19-10w, east of the Silica area, made potential of 995 bbls. of oil and was completed. It topped Siliceous lime at 3,272 feet, encountered water at 3,292 feet, total depth, and plugged back to 3,287 feet. It pumped 210 bbls. of oil before acidizing. Bradley Oil Co. No. 1 Wendell, NE SE NE section 32-19-10w, also east of Silica, was dry and abandoned in Siliceous lime at 3,286-3,387 feet, total depth. No shows of oil were reported in this test.

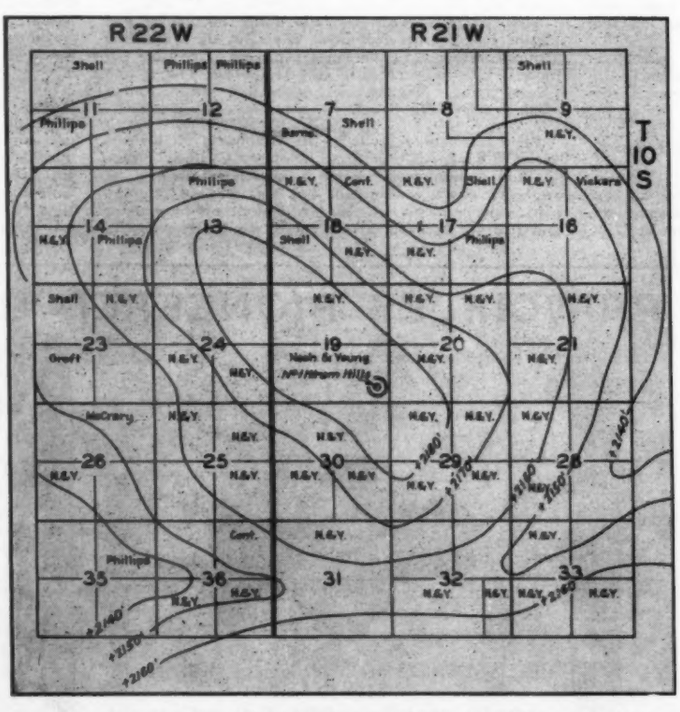
Slick, Pryor & Lockhart No. 4 Mezger, NE cor. section 21-20-10w, in the Raymond pool, made potential of 1,894 bbls. of oil and was completed at 3,355 feet, total depth. It pumped 1,675 bbls. in 19 hours. Siliceous lime was topped at 3,351 feet.

Continental Oil Co. and others have another good producer in the rapidly growing Geneseo area. It is the No. 2 J. R. Lansing, SW SE SE section 25-18-8w. Top of Siliceous lime, corrected, was 3,163 feet; total depth, 3,178 feet. It swabbed 359 bbls. in 10 hours before acidizing, and made potential of 1,553 bbls. after acidizing. In the Gouldner area, Vickers Petroleum Co. and others No. 2 Gouldner "A," NE NW NW section 16-18-9w, made potential of 863 bbls. of oil and was completed in Siliceous lime at 3,231-34 feet, total depth. Empire Oil & Refining Co. No. 4 Gouldner, SW cor. section 9-18-9w, had Siliceous lime at 3,240-44 feet, total depth, was treated with acid and made potential of 268 bbls. of oil. In the Keesling district, Gulf Oil Corp. No. 5 Hartle, NE NW NW section 15-20-9w, pumped 221 bbls. in 11 hours after acidizing and made potential of 453 bbls. Top of Siliceous lime was 3,226 feet; total depth, 3,260 feet. Saco Oil Co. and Gulf Oil Corp. No. 2 Foote, SW SE NE section 7-20-9w, in the Chase field, topped Siliceous lime at 3,270 feet and was completed at 3,286 feet, total depth. After acidizing with 3,000 gallons it made potential of 736 bbls. of oil.

New work in Rice County was as follows: Continental Oil Co. and others No. 2 Kimple, NE NE NW section 25-18-8w, moving in material; same operators' No. 4 Foote, NW NE SE section 7-20-9w, building rotary rig: Herndon Drilling Co. No. 2 Smith, SE NE SE section 16-20-9w, rotary rig; Gulf Oil Corp. No. 2 Emma Steckel, SE SE NE section 31-19-10w, building rig.

Near Completions

Hutchinson Oil Co. No. 3 Wendell, SE NW NE section 32-19-10w, pumped 800 bbls. of oil in 24 hours after acid treatment. Siliceous lime was topped at 3,288 feet, with pay at 3,326-40 feet, total depth. Sinclair Prairie Oil Co. No. 1 Kelly, NW cor. section 22-20-10w, topped Siliceous lime at 3,391 feet, drilled to 3,397 feet, total depth, and swabbed 500 bbls. in 19 hours. Gulf Oil Corp. No. 5 Coffman, SW cor. section 5-20-9w, was acidized and pumped 182 bbls. in 14 hours. Top of Siliceous lime was 3,232 feet; total depth, 3,249 feet. Sinclair Prairie Oil Co. No. 5 Sharp, NE cor. section 7-20-9w, swabbed 415 bbls. in 15 hours after acidizing, Siliceous lime at 3,242-62 feet, total depth. Gulf Oil Corp. No. 4 Keesling, NE SW SW section 10-20-9w, topped Siliceous at 3,214 feet; drilled to 3,244 feet, total depth, acidized and swabbed 120 bbls. in 9½ hours. Mid-Continent Petroleum Corp. No. 7 Hartle, NE SE NW section 15-20-9w, made potential of 919 bbls. after acidizing with 1,000 gallons. It was reacidized but had not been tested. It was bottomed at 3,229 feet.



Noah & Young No. 1 Hills, SE cor. section 19-10-21w, will test a structure in southeastern Graham County, Kansas, mapped by P. W. Anderson, Wichita

Estimated Production

Estimated daily average production in Kansas for the week ending May 16 and for the preceding week is as follows:

	Barrels	
	May 16	May 9
Oxford City	7,500	7,650
Burrton	13,400	14,100
Ritz-Canton	6,700	6,725
Hollow-Nikkel	4,175	4,625
Voshell	3,175	3,325
Ellsworth County:		
Lorraine-So. Lorraine	7,240	6,486
Other pools	2,049	1,145
Rice-Barton Counties:		
Chase	9,781	10,549
Raymond	4,017	2,709
Silica	12,657	9,778
Keesling	2,327	2,176
Miscellaneous Rice	4,919	3,941
Miscellaneous Barton	2,447	2,396
Russell County:		
Fairport	2,722	3,145
Gorham	4,523	4,584
Russell	3,815	3,402
Sullivan	2,990	2,976
Other pools	7,793	6,540
Sedgwick County:		
Valley Center	1,381	1,420
Greenwich	1,472	1,406
Robbins	1,560	1,512
Eastborough	849	855
Other pools	437	524
Ellis County	1,850	2,021
Kingman County	611	592
Stafford County	2,152	2,110
Greenwood County	9,500	9,750
Butler County	18,010	17,980
Other fields	20,448	20,778
Total Kansas	160,500	155,200

Barton County

Mid-Continent Petroleum Corp. No. 4 Schmidt, SE NE SW section 36-19-11w, in the Barton County sector of the Silica field, made potential of 1,797 bbls. and was completed in Siliceous lime at 3,274-76 feet, total depth. It was acidized and made potential of 913 bbls., later making the larger potential. Sinclair Prairie Oil Co. No. 1 Isern, SE SE SW section 25-19-11w, topped Siliceous lime at 3,289 feet; total depth, 3,322 feet, where water was encountered; plugged back to 3,312 feet. It pumped 115 bbls. in four hours, made potential of 244 bbls. and was completed.

One Barton County wildcat was completed as a new pool opener. It was the Simpson & Noble and Atlantic Oil Producing Co. and others No. 1 Hiss, C NW NE section 31-20-13w, south of Great Bend and just north of the Stafford County line. It topped Kansas City lime, the producing horizon, at 3,205 feet; total depth, 3,290 feet. It swabbed 230 bbls. in 24 hours before acidizing. After treatment with 3,000 gallons of acid, it pumped and flowed 969 bbls. of oil in 24 hours, down four hours. Top of Anhydrite was 753 feet.

Other Barton County completions were failures. E. H. Moore and Ma-

bee Drilling Co. No. 1 Feist, NW SW SE section 29-18-11w, had a hole full of water at 3,511-13 feet, total depth, and was dry and abandoned. Top of Siliceous lime was 3,477 feet. Derby Oil Co. No. 1 Roth, SW SW NE section 25-19-11w, was acidized after drilling to 3,385 feet, total depth, and plugging back to 3,380 feet without result, and was dry and abandoned. Top of Siliceous lime was 3,324 feet. Murphy & Morgan No. 1 Robinson, NE NE SW section 21-16-14w, was dry and abandoned with a hole full of water in Siliceous lime at 3,450-92 feet, total depth. It was a wildcat west of Stickney, in the northern part of the county. Top of Anhydrite was 935 feet; Oswald lime, 3,210 feet; Conglomerate, 3,415 feet. Morgan & Flynn and others No. 1 Zimmer, SE SE SW section 20-19-14w, a wildcat northwest of Great Bend, had a hole full of water at 3,593 feet, total depth, and was dry and abandoned. Top of Anhydrite was 819 feet; Conglomerate, 3,460 feet; Siliceous, 3,580 feet.

The following new work was reported in Barton County: Yarnell & Spencer No. 1 McLean, SW SW SE section 24-17-11w, rig; Yarnell & Carlson and others No. 1 Bloomer, NE NE NW section 36-17-11w, an old well, was cleaning out to deepen below 3,285 feet; Texas Co. No. 4 Schmidt, NE NW NW section 36-19-11w, location; Mid-Continent Petroleum Corp. No. 6 Schmidt, NE NE SW section 36-19-11w, building rotary rig; Continental Oil Co. No. 12 Risse, SW NW SE section 36-19-11w, ponds; same operator's No. 13 Risse, NW NW SE section 36-19-11w, building rig; Magnolia Petroleum Co. No. 6 Meda Steckel, NE SE NW section 1-20-11w, location; Texas Co. No. 1 McGreevy, SW SW SE section 30-20-13w, location.

Magnolia Petroleum Co. No. 4 Meda Steckel, SE SE NW section 1-20-11w, made potential of 384 bbls. after acidizing but had not been completed. It topped Siliceous lime at 3,285 feet; total depth, 3,305 feet. Buchanan & Alexander No. 1 Langfeld, NE NE SW section 14-20-11w, wildcat southwest of the Silica pool, was acidized with 1,000 gallons and swabbed 15 bbls. of oil in five hours. Kansas City lime was topped at 3,022 feet; total depth, 3,299 feet.

Russell County

Southern Oil Co. had the biggest Russell County producer of the week at the No. 1 Sellens, SW cor. section 29-15-13w. It topped Siliceous lime at 3,270 feet; drilled to 3,275 feet, total depth; was acidized, made potential of 2,003 bbls. and was completed. Oswald lime was topped at 3,023 feet. Same operator's No. 1 Shaffer, NE cor. section 31-15-13w, made potential of 1,272 bbls. after acid treatment and was completed at 3,259 feet, total depth. Oswald lime was topped at 3,004 feet; Siliceous lime, the producing formation, was topped at 3,253 feet. Sinclair Prairie Oil Co. No. 4 Hefferman, NW NW NE section 26-15-13w, was acidized with 2,000 gallons at 3,277 feet, total depth, and made potential of 17 bbls. It was reacidized with 1,000 gallons, made potential of 218 bbls. and was completed. Siliceous lime, the producing formation, was topped at 3,263 feet; Oswald lime, 3,000 feet.

Billings and others No. 7 Witt, SE NE SE section 4-14-15w, in the Gorham field, topped Anhydrite at 913 feet; Tarkio, 2,512 feet; Dodge, 3,019 feet; Oswald, 3,048 feet; total depth, 3,124 feet. It was acidized with 6,000 gallons, made potential of 825 bbls. of oil and was completed.

National Refining Co. No. 1 Reinhardt "C," NW NW SE section 25-14-15w, in the Neidenthal area, made potential of 692 bbls. of oil and was completed. Production was from Siliceous lime topped at 3,179 feet; total depth, 3,185 feet. It made potential of 467 bbls. before acidizing, and after treatment pumped 378 bbls. in 16 hours.

Hartman & Blair and others No. 1 Boxberger, NE NE NW section 33-13-14w, topped Anhydrite at 900 feet; Oswald lime, 3,028 feet; Siliceous lime, 3,286 feet; total depth, 3,292 feet. It swabbed 70 bbls. in 10 hours, and after acidizing made potential of 596 bbls., completed. Same operators No. 1 Gurney "B," SE cor. section 23-14-14w, found pay in Oswald lime topped at 2,930 feet and was completed at 2,978 feet, total depth. It was acidized and made potential of 456 bbls. in 17 hours.

The following new work was started in Russell County: Aylward and others No. 1 Mermis, SE SW SE section 18-12-15w, moving in material; Central Petroleum Co. No. 2 Ginther, NW NW SE section 19-12-15w, cellar; Saco Oil Co. and others No. 1 Furthmeyer, SW SW SE section 15-13-14w, machine; Phillips Petroleum Co. No. 2 Boxberger, C E half SW NW section 24-14-15w, moving in material; Carter Oil Co. No. 1 Sellens, NW cor. section 15-15-13w, location; Southern Oil Co. No. 2 Sellens, SE SW SW section 29-15-13w, moving in material; same operator's No. 2 Schaffer, NW NE NE section 31-15-13w, building rig; Coralena No. 2 Trapp, NE SE SE section 30-15-13w, building rig.

Hartman & Blair No. 3 Sullivan, NW NE SE section 2-14-15w, had Goham sand at 3,316 to 3,321 feet, total depth, and pumped 100 bbls. in seven hours.

Reno County

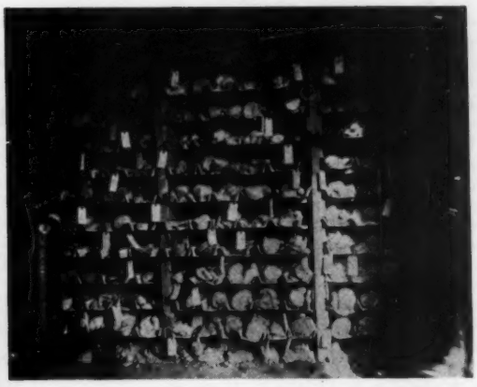
The four Reno County completions of the week included two producers and two failures. Texas Co. No. 5 Collins, SE NE SE section 17-24-4w, in the Burrton field, pumped and flowed 507 bbls. of oil in 24 hours and was completed in Chat at 3,303 to 3,382 feet, total depth. Olson Drilling Co. and Shell Petroleum Corp. No. 2 Hutchinson Lumber Co., C NW NE section 24-23-4w, was acidized, made potential of 274 bbls. and was completed. Chat was topped at 3,251 feet; total depth, 3,382 feet. Gas measured 7,000,000 feet.

McPherson Drilling Co. and others No. 1 Schrock, SW SW NW section 27-24-5w, in the Yoder area, was dry and abandoned in Siliceous lime at 3,897-3,918 feet, total depth. Chat was topped at 3,367 feet; Viola lime, 3,778 feet; Wilcox sand, 3,804 feet. Sinclair Prairie Oil Co. No. 1 Hoffer, NE NW NW section 31-24-4w, in the Haven area, failed to make a producer by acidizing and was dry and abandoned. It topped Kansas City lime at 2,667 feet; Chat, 3,369 feet; Hunton lime, 3,727 feet; total depth, 3,745 feet; plugged back to Chat, drilled to 3,415 feet and acidized, with no results.

New work in Reno County: W. C. McBride, Inc., No. 1 Siemens, SW SE SE section 36-22-4w, building rotary rig; Graham and others No. 1 Miller, NE NE SE section 36-25-10w, wildcat northwest of the Lerado pool, building rotary rig; Shell Petroleum Corp. No. 2 Welch "A," SW cor. sec-

(Continued on Page 152)

Cores *Exclusively* By DEAN CORE DRILLS



Cores like those illustrated above present a clear, vivid picture of all formations just as they are in the hole, and are invaluable as guides to intelligent drilling procedure in both wildcat and proven territory.

Dean Core Drills with regular and rock type core heads were used exclusively to core the Butler No. 1 wildcat well at Puente, California; from which these cores were recovered. The cores speak for themselves—sufficient evidence for the most skeptical of the high efficiency of these dependable coring tools.

Dean Core Drills are manufactured in all standard sizes from 5¾" to 27" diameter; with standard 20 ft. barrels; and interchangeable regular type and rock type core heads for coring all soft and hard formations. Write for illustrated, descriptive bulletin.

Derrick Man Jack Pitts, inspects one of the Dean regular type core heads used to core the Butler No. 1 wildcat well at Puente, California.

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Oklahoma Operations

By DAL DALRYMPLE

MORE OF OKLAHOMA CITY IS OPENED TO OIL OPERATIONS

The twenty-sixth oil well was completed in the Capitol extension zone of the Oklahoma City field, and another drilling campaign was being planned for the new area opened to drilling as a result of the election of May 12. The newest producer in the extension area was the British-American Oil Co. No. 2 Alta Vista, NW SW section 23-12-3w, at Northeast Twenty-third Street and Kelley Avenue, on the east edge of production. At total depth of 6,450 feet, it made potential of 16,872 bbls., with 18,000,000 feet of gas. Several new tests were being started in the extension zone, three locations being staked north of the city limits.

Elsewhere in Oklahoma there was much activity, with the Fitts, Olympic, Crescent, Lucien and Edmond areas getting good producers. In the south part of the Lucien pool, Stanolind Oil & Gas Co. and Amerada Petroleum Corp. No. 3 Pfeiffer, C S half SE SW section 33-20-2w, in Logan County, flowed 2,886 bbls. in 12 hours, with gas gauging 5,000,000 feet. It flowed 776 bbls. in three hours before being shut in for potential test. First Wilcox sand was topped at 4,870 feet; second Wilcox sand, 4,947 feet; total depth, 5,066 feet. This well is on the west edge of the southern extension of the pool, other wells in the immediate sector being small producers. It is the largest well to tap the pay in the Lucien area in many months.

In the Edmond field, Continental Oil Co. No. 7 Young, NE NW NW section 31-14-3w, flowed 235 bbls. of oil in the first hour after acidizing. It topped Wilcox sand at 6,645 feet; total depth, 6,650 feet.

Interesting Wildcats

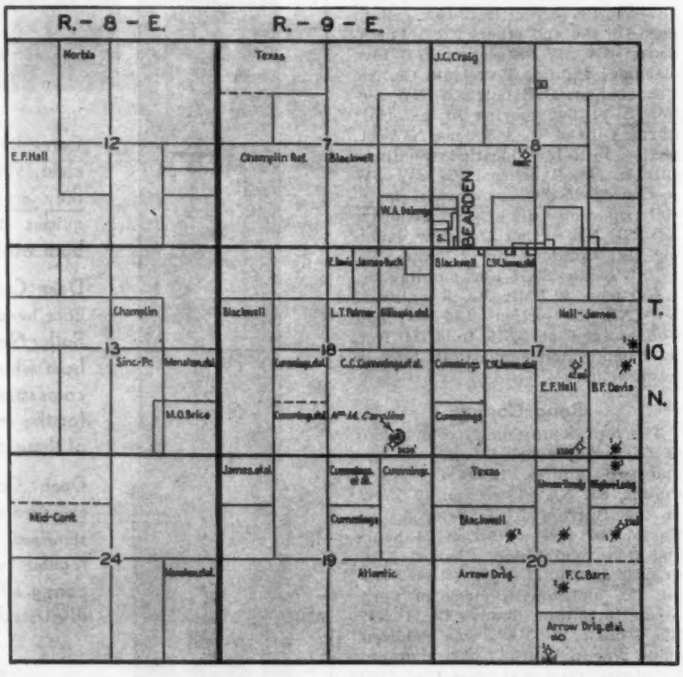
Several wildcats continued to hold operators' attention. Stanolind Oil & Gas Co. and others No. 1 Brunken, SW SW NE section 32-23-4w, in Garfield County, north of the Garber pool, swabbed an average of 5 bbls. of oil and 2½ bbls. of water, and operators were preparing to deepen from 6,051 feet. Sinclair Prairie Oil Co. No. 1 Stockton, SE SE SW section 26-6s-2w, in Love County, was coring in Dense lime below 8,466 feet, looking for Wilcox sand. This closely watched test now is about 300 feet deeper than the Carter Oil Co.'s deep producer in the Fox field of Carter County to the north. Amerada Petroleum Corp. and Stanolind Oil & Gas Co. were pulling tubing to clean out at No. 1-A Westheimer & Daube, SW SE SW section 27-6s-2e, another Love County wildcat of interest. Originally bottomed at 7,363 feet, was plugged back to 6,330 feet and acidized, but efforts to make it produce have been futile to date. The far western test of the Carter Oil Co., the No. 1 Davidson, C NW SW section 2-9-23w, in the Erick area of Beckham County, was testing after 800 feet of oil and drilling fluid rose in the hole on a drill stem test in Granite Wash at 3,684-90 feet.

Oklahoma County

British-American Oil Co. No. 1 Burnham, SE NW SW section 23-12-3w, on the east side of development in the Capitol extension area of the Oklahoma City field, made 24-hour potential of 7,683 bbls. of oil on gas lift and was completed at 6,502 feet, total depth. It flowed 1,844.37 bbls. in six hours on potential test, producing 1,280.53 bbls. in the last four hours of test. Second Wilcox sand was topped at 6,347 feet. Same operator's No. 3 Piersol, NE SE SE section 22-12-3w, one of the older completions in the extension area, was deepened from 6,390 feet to 6,525 feet, without material increase in flow. On open flow test it produced 5,294 bbls. in 10 hours and 20 minutes, with 24,900,000 feet of gas. Top of second Wilcox sand was 6,338 feet.

Only two new tests were reported in the Oklahoma City area, the new activity following the recent election not having got under way. Skelly Oil Co. No. 1 Gast, SW NW SE NW section 26-12-3w, was a rig. Hall & Briscoe and others No. 1 Thompson, NW NW SW NW section 26-12-3w, was a location.

Commercial Drilling Co. and others No. 1 Brandenburg, NW NW SW section 34-8-4, in the St. Louis area of Pottawatomie County, was acidized and flowed 165 bbls. of oil net in 24 hours and was completed at 4,100 feet, total depth. Hunton lime, the producing formation, was topped at 3,840 feet. Texas Co. and Fuhrman No. 3 Cherry, NE NW NW section 25-7-4, an old well, was plugged back and recompleted at 4,325 feet, total depth, swabbing 5 bbls. of oil in 24 hours. Original total depth was 4,332 feet. No new work was reported in Pottawatomie County.



Map of area west of Bearden gas field, Okfuskee County, Oklahoma, where C. C. Cummings and others No. 1-A Carolina has found Senora sand production

(Mid-Continent Map Co., Tulsa, Okla.)

Pontotoc County

Four more good producers were completed in the Fitts field of Pontotoc County. Samedan Oil Co. No. 3 Holkum, SE SW NE section 27-2-7, made potential of 4,162 bbls. of oil after acid treatment and was completed at 4,275 feet, total depth. Gas measured 2,581,000 feet. It would not flow before acidizing. Bromide was topped at 3,975 feet; McLish, 4,185 feet. Magnolia Petroleum Co. No. 1 Norris, SW SW SE section 21-2-7, topped Hunton lime, the producing formation, at 3,469 feet; Sylvan shale, 3,780 feet; total depth, 3,790 feet. It was acidized with 8,000 gallons and flowed 518 bbls. in the first hour through casing, 160 bbls. in the second hour through tubing, and 814 bbls. in six hours through tubing.

E. H. Moore and others No. 8 Schauers, NW SE NW section 29-2-7, made potential of 2,721 bbls., with gas gauging 1,965,000 feet, and was completed at 4,349 feet, total depth. Top of Bromide was 4,110 feet; McLish, 4,335 feet. Bottom hole pressure was 1,268 pounds. J. E. Crosbie, Inc., No. 2-B Harden, SE NE NE section 30-2-7, topped Hunton lime, the producing horizon, at 3,463 feet and was completed at 3,780 feet, total depth. Sylvan shale was topped at 3,754 feet. It would not flow before acidizing with 10,000 gallons. After acidizing, it flowed 514 bbls. in five hours through tubing, and 1,456 bbls. in 24 hours. Gas was estimated at 1,500,000 feet. Bottom hole pressure was 1,310 pounds.

The following new work was started in Pontotoc County: E. H. Moore and others No. 1 Burris, NW SE SE section 22-2-7, location; same operators' No. 5-A Wirick, SW SW SE section 29-2-7, cellar and pits; Skelly Oil Co. No. 12 Park College, NE NW NE section 28-2-7, building rig; Magnolia Petroleum Co. No. 3 Wooley, NW NE NE section 28-2-7, set 20-inch casing at 57 feet; same operator's No. 7 Burris "A," SE SW NW section 27-2-7, cellar and pits; the company's No. 6 Burris "B," NW SE NE section 28-2-7, location; the No. 7 Burris "B," SE NE NE section 28-2-7, cellar and pits; the No. 8 Burris "A," NW SE NW section 27-2-7, location; the No. 9 Burris "A," NW SW NE section 27-2-7, location; Amerada Petroleum Corp. No. 1 Woolley, SW SE SE section 21-2-7, location; Fleetborn Oil Corp. No. 4 Morin, SW SW SE section 20-2-7, building rig; Campbell and others No. 1 Owensby, NE SW SW section 21-3-4, location; Benedum & Trees No. 5 Molloy, SE SW SW section 30-5-5, rigging up rotary; Sunray Oil Co. No. 4 Shields, NE SW SE section 33-5-8, old well being deepened, shut down at 11,196 feet for casing.

H. L. Blackstock and others No. 2 Daniels, SW SE SW section 21-2-7, was treated with 5,000 gallons of acid and flowed 605 bbls. of oil gross in five hours through tubing. It was reacidized with 10,000 gallons and was waiting. It topped Bromide at 4,320 feet; total depth, 4,360 feet. Magnolia Petroleum Co. No. 6 Burris "A," NE SW NW section 27-2-7, flowed 631 bbls. of oil through casing in the first hour after acidizing with 8,000 gallons, and 175 bbls. the second hour through tubing. It made potential of 3,751 bbls., but had not been completed. Gas gauged 2,427,000 feet. Top of Viola lime was 3,769 feet; total depth, 4,303 feet. Sinclair Prairie Oil Co. No. 4 Burris, SE NW NW section 27-2-7, topped McLish at 4,297 feet and was bottomed at 4,400 feet. It was acidized with 5,000 gallons

and flowed 66 bbls. of oil net in two hours through tubing. It was reacidized with 10,000 gallons and was waiting. Same operators' No. 5 Burris, NW cor. section 27-2-7, flowed 110 bbls. in one head after acidizing and went dead; it then flowed 86 bbls. in 24 hours through tubing. It was reacidized with 10,000 gallons and was waiting. Magnolia Petroleum Co. No. 1 Woolley, NW NE NE section 28-2-7, flowed 568 bbls. through casing in the first hour after acid treatment and 139 bbls. through tubing in the second hour. It made potential of 3,488 bbls. but had not been completed. Total depth was 4,300 feet. E. H. Moore and others No. 6 Schauers, SW SE NW section 29-2-7, was shut in at 4,350 feet, total depth, after flowing 292 bbls. of oil in one hour through drilling equipment. Same operators' No. 10 Schauers, SE NW NW section 29-2-7, flowed 537 bbls. in two hours after acidizing with 6,000 gallons and was to drill ahead. It was bottomed at 4,099 feet. Same operators No. 11 Wirick, SE SW SE section 29-2-7, made potential of 3,308 bbls., but was not completed. Wilcox sand was topped at 4,330 feet; total depth, 4,335 feet.

Seminole County

Carter Oil Co. and others completed the only Seminole County producer of the week at No. 6 Pipkin 28-C, C W half NE SW section 2-10-6, in the Keokuk field. It flowed 331 bbls. of oil in 15 hours, making potential of 424 bbls. Production was from Misener sand, topped at 4,104 feet, and Hunton lime, topped at 4,119 feet. Total depth was 4,134 feet.

Wofford Brothers No. 1 Norvell, SE NE SE section 26-6-7, was dry and abandoned at 2,370 feet, total depth. It had drill pipe stuck at 2,695 feet and shot off pipe at 2,300 feet. Lynch Brothers Drilling Co. No. 1 Cravens, SW SE NE section 19-5-6, swabbed 6 bbls. of oil in 24 hours but failed to make a commercial producer after acidizing, plugging back and shooting, and was dry and abandoned. Hunton lime was topped at 2,484 feet; Sylvan shale, 2,622 feet, total depth. It was plugged back to 1,820 feet, and shot two times, resulting in small production. Blackwell Oil & Gas Co. No. 4 Baker, NW NW SE section 11-7-6, an old well, was deepened from 4,174 feet to 4,288 feet and swabbed 609 bbls. of oil in 24 hours. It then pumped 480 bbls. in 24 hours and was recompleted. First Wilcox sand was topped at 4,150 feet; second Wilcox sand, 4,280 feet.

The following new work in Seminole County was reported: W. B. Pine No. 4 Cheparney, SE NE SW section 12-5-7, location; Wofford Brothers No. 1-A Norvel, SE NE SE section 26-6-7, rigging up rotary; Texas Co. No. 4 Janey, NE NE SW section 11-7-6, an old well, was moving in tools to deepen; Fleetborn Oil Corp. No. 6 Stump, NE SE SW section 27-8-8, location.

Pioneer Drilling Co. and Phillips Petroleum Co. No. 1-A Fixico, C N half S half NE section 26-9-6, in the Seminole area, swabbed 50 bbls. in 12 hours after acidizing with 3,000 gallons. Hunton lime was topped at 3,863 feet; Sylvan shale, 3,868 feet; total depth, 3,873 feet. Uscan Oil Co. No. 2 Oliver, NE SE NE SW section 28-9-6, was shot with 30 quarts and swabbed 299 bbls. in 24 hours. Wilcox sand was topped at 4,156 feet; total depth, 4,160 feet. Deep Rock Oil Co. No. 3 Hagler, SW NW NE section 19-9-7, flowed 475 bbls. of oil, cutting 8 per cent water, in 12 hours. Gilcrease sand was topped at 3,433 feet; total depth, 3,443 feet. Texas Co. No. 3 Steward, SE SW NE section 19-9-7, was bottomed at 3,495 feet and swabbed 105 bbls. of oil in 14 hours. Cromwell sand was topped at 3,480 feet. Gulf Petroleum Corp. and others No. 2 Scott 43-C, C E half SE NW section 11-10-6, an old well, was deepened from 4,152 feet to 4,170 feet and after a shot flowed 298 bbls. of oil in 24 hours. It was to be acidized. Carter Oil Co. No. 2 Parsons, C W half NW SW section 14-10-6, topped Hunton lime at 4,245 feet, drilled to 4,246 feet, and flowed 416 bbls. through casing in nine and one-half hours.

Estimated Production

Estimated daily average production of Oklahoma for the week ending May 16 and for the preceding week is as follows:

	Barrels	
	May 16	May 9
Allen	7,950	7,800
Asher-West Asher	800	825
Burbank	7,700	7,750
South Burbank	14,650	14,750
Balance Osage	23,750	24,000
Blackwell district	4,475	4,500
Bristow-Slick	8,425	8,750
Chandler	4,150	4,250
Crescent	5,650	5,250
Cromwell	3,750	3,875
Cushing-Shamrock	11,500	11,650
Duncan district	4,150	4,225
Edmond	12,625	10,925
Fish	10,125	10,300
Fitts	43,025	54,625
Gray	1,525	1,575
Graham	4,150	4,225
Healdton	9,150	9,350
Hewitt	4,450	4,500
Holdenville	1,075	1,075
Keokuk	7,000	3,825
Konawa	1,725	1,825
Lucien	13,650	13,500
Marshall-Lovell	975	975
Oklahoma City	155,400	127,950
Olympic	7,325	6,650
Papoose	1,125	1,150
Polo	3,250	3,700
Sasakwa and townsite	4,100	4,000
Sholem-Alechem	3,650	3,750
Seminole field:		
Bowlegs	13,725	14,075
Carr City	7,425	7,275
Earlsboro	7,550	7,650
South Earlsboro	825	1,000
East Earlsboro	11,425	10,925
Little River	13,300	13,275
East Little River	1,250	1,200
Maud	900	950
Mission	2,600	2,100
Seminole	11,050	10,825
East Seminole	3,075	2,625
Searight	5,950	4,800
Total Seminole	79,075	76,700
St. Louis-Pearson	26,150	25,975
Tatums	3,550	3,500
Tonkawa-Garber-Thomas	5,500	5,500
Wewoka	3,875	3,975
Yale-Jennings	4,100	4,150
Other pools	57,000	56,500
Total Oklahoma	560,525	537,325

Hughes County

Mid-Continent Petroleum Corp. No. 7 Hampton, SE NW NE section 1-9-8, in the Olympic area of northwestern Okfuskee County, was shot with 60 quarts and flowed 250 bbls. of oil in 12 hours, completed. Senora sand was topped at 1,680 feet; total depth, 1,735 feet. Carter Oil Co. No. 5 Hampton, SE SE NE section 1-9-8, topped Senora sand at 1,670 feet and was completed at 1,720 feet, total depth, after a shot with 65 quarts. It flowed 180 bbls. in 14 hours through casing and 135 bbls. in 24 hours through tubing. George Manahan and others No. 1 Oliphant "F," SE NE SE section 2-9-8, pumped 100 bbls. in 24 hours after a 30-quart shot and was completed at 1,833 feet, total depth. Senora sand was topped at 1,805 feet. J. Garfield Buell No. 4 R. Buck, C SW section 21-9-10, had a hole full of water after 10 shots at 3,140-63 feet and was dry and abandoned. Top of Cromwell, 3,142 feet; Woodford, 3,775 feet; Hunton lime, 3,790 feet; total depth, 3,823 feet.

New work in Hughes County: J. A. Chapman No. 4 fee, NW NE NW section 1-9-8, location; Kingwood Oil Co. and Phillips Petroleum Co. No. 7 Rogers, C E half SW SW section 3-9-9, old well being deepened, drilling at 1,115 feet; Gulf Oil Corp. No. 1 Tiger, NW NW SW section 6-9-9, location; Amerada Petroleum Corp. and Stanolind Oil & Gas Co. No. 1 Mann, SW SW NW section 6-9-9, rigging up rotary; same operator's No. 2 Mann, NW SW NW section 6-9-9, location; Buell & Herndon No. 1 Turner, NE SE NW section 28-9-10, old well, rigging up to deepen; same operator's No. 3 Turner, C SE NW section 28-9-10, location.

Okfuskee County

Three new Senora sand producers were completed in the Okfuskee County extension of the Olympic pool, while a fourth Senora producer was completed west of the Bearden area to the north. Amerada Petroleum Corp. and Stanolind Oil & Gas Co. No. 2 Carolina, NW SW SW section 31-10-9, topped the sand at 1,741 feet and was completed at 1,770 feet, total depth. After a shot with 30 quarts, it flowed 157 bbls. of oil in 24 hours. Gas gauged 100,000 feet. George Manahan and others No. 4 Dalton, NW SE SE section 36-10-8, flowed 145 bbls. of oil in 12 hours, completed. It topped Senora sand at 1,726 feet; total depth, 1,746 feet. Same operators' No. 5 Dalton, SW SW SE section 36-10-8, topped sand at 1,704 feet, drilled to 1,728 feet, total depth, and after a shot with 30 quarts flowed 150 bbls. of oil and 5 bbls. of water in 24 hours.

West of Bearden, Ark Royalty Co. No. 1-A Fisher, SW SE SE section 18-10-9, topped Senora sand at 1,745 feet and was bottomed at 1,834 feet. It pumped 34 bbls. in nine hours, completed. At 1,830 feet, 1 foot above base of sand, it was shot with 70 quarts and swabbed 75 bbls. in two hours, swabbing dry, before deepening. This well also was listed as C. C. Cumming and others No. 1-A Carolina.

Panther Oil Co. No. 3-B Smith, C NE NE section 11-11-11, in the Fields area, pumped 1 bbl. of oil in 24 hours and was completed at 1,206 feet, total depth. Sand was topped at 1,180 feet. W. B. Wells No. 2 Clark, C NW NW section 11-10-11, in the Weleetka area, had sand at 2,096 to 2,110 feet, total depth. It was shot with 40 quarts, pumped 20 bbls. of oil in 24 hours and was completed. Moffett and others No. 2 Mingo, NW NE SW section 25-10-10, was dry and abandoned at 2,635 feet, total depth. Gilcrease sand was topped at 2,628 feet.

Only one new operation was reported in Okfuskee County. Manahan & Grisso No. 7 Dalton, SE NE SE section 36-10-8, was a rig.

Osage County

Sinclair Prairie Oil Co. and Indian Territory Illuminating Oil Co. No. 7 Osage, NE SW SE section 9-25-6, on Tract 140 in the South Burbank field of Osage County, made potential of 2,632 bbls. of oil and was completed at 2,820 feet, total depth. It flowed 658 bbls. in six hours, with gas estimated at 6,000,000 feet. Bartlesville sand was topped at 2,791 feet. Carter Oil Co. No. 1 Mary Kenworthy, NE NE NW section 16-25-6, topped Bartlesville sand at 2,811 feet and was completed at 2,835 feet. It flowed 1,199 bbls. of oil in 24 hours.

Lewis Production Co. and Continental Oil Co. No. 7 Ah-Kah-Ne, NE NW SE section 9-24-7, in the Naval Reserve sector, had Bartlesville sand at 2,546-2,614 feet, total depth, and flowed 18 bbls. of oil an hour naturally. After a shot with 60 quarts, it flowed 425 bbls. in 24 hours and was completed. Same operators' No. 8 Ah-Kah-Ne, NW NE SE section 9-24-7, flowed 547 bbls. of oil in 24 hours after a shot with 60 quarts and was completed. It topped Bartlesville sand at 2,517 feet; total depth, 2,594 feet.

Ray Branstetter No. 3 Osage, C W half E half SW section 28-22-11, topped Hominy sand at 2,022 feet; drilled to 2,108 feet, total depth, where water intruded, and was plugged back to 2,100 feet to complete. It swabbed 90 bbls. of oil in 16 hours. G. V. Labadie and others No. 1 Osage, SW SW NE section 14-24-8, an old well, was deepened from 1,956 feet and recompleted at 2,323 feet. It pumped 10 bbls. of oil daily. Burgess sand was topped at 2,282 feet.

New Osage County work: Indian Territory Illuminating Oil Co. No. 442 Osage, NW SE SE section 34-24-8, rigging up machine; Ohio Osage Oil Co. No. 10 Osage, SE NW NW section 34-21-9, location; Galt Brown No. 2 Osage, SE NE SW NE section 14-24-8, drilling at 450 feet; Sinclair Prairie Oil Co. No. 2 Osage, SE SE SW section 9-25-6, on Tract 236, location; Idaho Oil Co. and others No. 2 Osage, SW NE SW section 18-22-12, an old well, preparing to deepen.

Logan County

Carter Oil Co. and Gulf Oil Corp. No. 2 Miller, SW NE SE section 28-17-4w, in the Crescent area, bailed and swabbed and started flowing at the rate of 75 bbls. an hour. First sand was topped at 6,092 feet; second sand, 6,233 feet; total depth 6,283½ feet. It was not completed. Continental Oil Co. No. 2 McConnell, NW SE SE section 28-17-4w, flowed 425 bbls. in four hours after shot and made potential of 2,835 bbls., with 54,000,000 feet of gas. Another potential test was being made. Total depth is 6,035 feet.

In the Logan County sector of the Lucien pool, Stanolind Oil & Gas Co. and Amerada Petroleum Corp. No. 3 Pfeiffer, C S half SE SW section 33-20-2w, drilled to 5,066 feet, total depth, flowed 776 bbls. in three hours and was shut in for potential test. Second Wilcox sand was topped at 4,947 feet.

Noble County

Stanolind Oil & Gas Co. and Amerada Petroleum Corp. No. 1 Gillham, NE SE SE section 14-22-1e, was the location for a wildcat test northeast of the Otoe City area in Noble County.

McIntosh County

Oklahoma Oil Corp. No. 1-A Wolf, SE SW SE section 35-12-17, wildcat east of Checotah in McIntosh County, was dry and abandoned at 3,570 feet, total depth. It topped Viola lime at 3,378 feet; Wilcox sand, 3,428 feet, and had a hole full of water at 3,555-70 feet.

S. E. Dieckman No. 1 K. McIntosh, SE cor. section 4-12-17, north of Rentieville, was the only new operation in McIntosh County. It was shut down for water at 100 feet.

Carter County

Only one well was completed in Carter County. Bull Head Oil Co. No. 22 A. Daney, NW SW SW section 4-4s-3w, was acidized with 200 gallons at 1,068-81 feet, total depth, pumped 8 bbls. of oil in 24 hours

and was completed. The Healdton sand series was topped at 900 feet.

Reports of new work in Carter County: Phillips Petroleum Co. and others No. 2 Byrd, SE SW SW section 4-2s-2w, location; Shell Petroleum Corp. No. 4 Higgins, SE NW SE section 6-2s-2w, location; Ideal Oil Co. No. 10 Scroggins, NE SW SE SE section 32-3s-3w, rigging up machine.

Pittsburg County

Utilities Production Co. No. 5 Koehler, SW SW SE section 11-7-18, in the Quinton gas field, was drilling below 200 feet. It was the only new work in Pittsburg County.

Marshall County

The following new work in Marshall County was reported: John W. Knaggs No. 3 Adams, SW SE SW SE section 31-7s-6, location; same operator No. 2-A Adams, NE SE SW SE section 31-7-6, drilling below 265 feet.

Okmulgee County

Aggis Drilling Co. No. 3-A McKinney, SW NW SW section 16-15-14, in the Bald Hill area, was the only Okmulgee County completion that found oil, although an old well was deepened with good results. The No. 3-A McKinney had sand at 858-63 feet, total depth 865 feet, pumped 5 bbls. of oil in 24 hours and was completed. The old well deepened was the Oklahoma Oil Corp. No. 1 Burgess, SE SW NE section 26-12-12, which pumped 15 bbls. of oil in 24 hours after deepening from 2,180 feet to 2,393 feet.

Hazlett and others No. 5 Burton, CSL SE SE section 25-14-12, topped Wilcox sand at 2,725 feet and was abandoned at 3,102 feet, total depth. Howard No. 2 Rentie, NE NW SE section 18-14-15, was dry and abandoned at total depth of 1,262 feet. It had sand at 675-852 feet. Harmon No. 1-A Bright, SE NW SE section 31-15-12, had sand at 2,250-56 feet; total depth 2,281 feet, and was abandoned. Gore No. 1-A Anderson, SE SW NE section 36-16-14, was dry and abandoned at 1,405 feet, total depth.

New work in Okmulgee County follows: Ford No. 4 Hardridge, CSL N half NE section 14-13-12, location; Hyer No. 1-A Foshee, SW SE SW section 4-13-14, rigging up standard tools; Blaise No. 25 Fox, SE SE NW section 22-13-14, machine; Robinson No. 2 Burton, SW SE NW section 30-14-13, spudded; Iverson Tool Co. No. 1-A Carter, SW NE NW section 20-14-14, drilling below 200 feet.

Lincoln County

Stanolind Oil & Gas Co. and Amerada Petroleum Corp. No. 2 Adams, NW NE NE section 5-14-3, in the Hoyt area of Lincoln County, topped Wilcox sand at 5,088 feet and was completed at 5,091 feet, total depth. It flowed 1,234 bbls. of oil through casing in the first 24 hours, and 728 bbls. in 9½ hours through tubing. Skinner sand was topped at 4,403 feet; Bartlesville, 4,460 feet; Brown lime, 4,670 feet; Mayes, 4,730 feet; Woodford, 4,775 feet; Hunton, 4,820 feet; Sylvan, 4,896 feet, and Viola lime 4,996 feet.

Cleveland County

Two new tests were started in the Moore area of northern Cleveland County. Anderson-Prichard Oil Co. No. 1 State, SW SW SE section 16-10-2w, and Denver Producing & Refining Co. and others No. 1 Keller, NW NW NE section 34-10-2w, were digging cellar and pits.

Creek County

Smiley & Brown No. 1 Jones, NE NE NW section 7-15-7, in the Lincreek area of Creek County, was completed as a 20-bbl. pumper. It had Bartlesville sand at 3,033-50 feet; total depth 3,672 feet; plugged back to 3,075 feet and drilled out to 3,250 feet. Adamson No. 5 Weaver, NE SE SE section 5-18-11, had sand at 1,739-70 feet, total depth, pumped 5 bbls. of oil in 24 hours and was completed. Jackson No. 3 Nolan "A," NE cor. section 2-17-8, topped Layton sand at 1,205 feet; total depth 1,566 feet. It was shot two times, plugged back to 1,265 feet and pumped 9 bbls. of oil in 24 hours, completed. Same operator No. 7 Bear, SE cor. section 35-18-8, topped Jones sand at 1,592 feet; total depth 1,621 feet, swabbed 50 bbls. of oil in 24 hours and was completed. Hanser and others No. 1 Burgess, NE NE SE section 25-18-10, had Red Fork sand at 1,760-1,802 feet and was bottomed at 1,802 feet. After a 60-quart shot it swabbed 20 bbls. of oil in 24 hours and was completed.

Sinclair Prairie Oil Co. No. 21 Jones, CNL S half NW section 3-17-7, an old well, was deepened from 2,493 feet to 2,560 feet and pumped 15 bbls. of oil in 24 hours. Same operators No. 23 Jones, NE SE NW section 3-17-7, an old well deepened from 2,476 feet to 2,573 feet, pumped 20 bbls. of oil and was recompleted.

The following new work in Creek County was reported: Anthony No. 1-A Bruner, NW NE NE section 4-16-12, rigging up; Smith and others No. 3 Blevens, NE NW SE section 25-14-9, drilling below 1,290 feet; Kirchner and others No. 1-A Marrison, CWL SW SW section 16-17-8, standardizing; Abraham and others No. 1-A Dickson, NE SE NE section 24-17-9, machine.

Tulsa County

Two failures marked the week in Tulsa County. Potter No. 1 Childers, SW SW NE section 3-17-14, was dry and abandoned at total depth of 1,580 feet. It had sand at 1,480 to 1,490 feet. Mechling No. 2 Grayson, CSL NE NE section 18-19-14, was dry and abandoned in sand at 1,330 to 1,349 feet, total depth.

Muskogee County

No new wells in Muskogee County were completed. The only new test was the Morrison No. 2-A Reed, CNL NW SW section 18-14-16, rigging up machine.

Stephens County

Texas Co. No. 2 Tomlin, SW NW NE NW section 15-3s-5w, in the Loco area of Stephens County, had sand at 1,451 to 1,463 feet, pumped 20 bbls. of oil in 24 hours and was completed at 1,464 feet, total depth. L. A. Wilkins and others No. 9 Crump, NW SE SE section 10-2s-5w, had sand at 781-804 feet; total depth 805 feet; pumped 10 bbls. of oil in 24 hours and was completed. Mudge Oil Corp. No. 4 Anderson, C E half SW SW section 10-3s-5w, had water at 1,390-1,478 feet, and was abandoned. It topped Arbuckle lime at 1,502 feet, drilled to 1,964 feet and plugged back to 1,580 feet.

The following new work was reported in Stephens County: George L Pace and others No. 4 Duncan, NW NW NE section 28-2s-7w, drilling below 500 feet; Mudge Oil Co. No. 5 Anderson, SW SE SW SW section 10-3s-5w, drilling below 60 feet; Texas Co. No. 3 Tomlin, NW SW NE NW section 15-3s-5w, location.

Southwestern Oklahoma

Completions in southwestern Oklahoma follow: In Comanche County, Sherley Clum No. 1 Kindt, NW NW NW SW section 27-2-10w, dry and abandoned at 1,085 feet, total depth. In Jefferson County, Long, Yingling & Lauck No. 18 Seay, SE SW SE section 3-7s-5w, in the Oscar area, had sand at 1,072-94 feet, total depth, and pumped 21 bbls. of oil in 24 hours. In Beckham County, Wood Petroleum & Royalty Corp. No. 1 Blair, C NW SE section 32-9-26w, wildcat, was dry and abandoned at 2,989 feet. It had water in Granite Wash at 2,942-71 feet.

New work in southwestern Oklahoma: In Comanche County, W. O. Swain No. 1 School Land, SW SE SW section 20-2-10w, machine; Theimer and others No. 1-A Jacobs, C W half SE SW section 30-2-10w, location.

In Jefferson County, Pearson and others No. 1 Douthitt, NE cor. section 24-6s-9w, wildcat near the Red River, material on ground.

In Kiowa County, Beeler & Klein No. 1 Parrish, SE SE NW section 3-6-15w, wildcat, machine; Atlantic Oil Producing Co. No. 1 Ta-Home, NE NW NE section 24-7-16w, wildcat, drilling below 1,105 feet; E. A. De Bolt and others No. 1 Burnett, NW SE NE section 30-7-20w, wildcat, location.

In Cotton County, Shasta Oil Co. No. 13 Cobb, NE SW SW NE section 2-2s-10w, location.

In Jackson County, Gulf Oil Corp. No. 1 Southern, NE SE SE section 31-1n-19w, old well deepening, drilling at 2,739 feet; same operators No. 3 Shirley, NW NW NE section 6-1s-19w, rig; same operators No. 1 McDaniel, SW SE NE section 3-1n-20w, cellar and pits.

In Tillman County, Shirley, Clum and others No. 1 P. A. Moricle, NW NW SE section 16-4s-14w, wildcat, rigging up rotary; G. Bernheim, NE NE NW section 16-1s-19w, location.

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West and North Texas

By
L. E. BREDBERG

54 NEW OPERATIONS LISTED IN WESTERN TEXAS DISTRICT

FORT WORTH, Tex., May 18.—Another location record was made in the West Texas district when 54 new starts were reported. This is the greatest number of new operations reported for one week since 1929, when activities were at their highest in that district. There were also 33 wells completed in the district in the past week, seven of which were either wildcat or semiwildcats which proved dry. One of these wildcats was of particular interest since it recently logged a good showing of oil and appeared as a possible producer and perhaps an extension to the McDowell pool in Glasscock County, or a new pool opener for that county. This test, Fleetborn Oil Corp. No. 1 F. D. Dodson, in section 13, Block 34, Township 3s, T.&P. Survey, was given up as a failure at a total depth of 3,247 feet. Elevation is 2,714 feet. It is located about 6 miles south of the above mentioned pool.

The Richards or Post pool in Garza County received a fair sized producer this week, and one of the best of the few producers yet completed in the county, when M. L. Richards completed No. 1 Post Estate, about 3 miles south of Post for a 70-bbl. well at total depth of 2,920 feet. The same operator made location for another test to be drilled in section 1,232, D. L. Phillips Survey, on U. U. Post Estate lands. The Brown Eagle Oil Co. has moved in a spudder for a test in Block 5, K. Aycock Survey, and if these two new tests also prove producers more drilling is slated for this comparatively new pool.

George Callihan of Albany has moved in a rig on S. J. Winter farm in Subdivision 3, Alexander Thompson Survey No. 20, about 4 miles north of Abilene, Taylor County. A 2,250-foot test is to be drilled on this absolutely wildcat location. It is located in the center of a large block held by Grisham-Hunter Corp. of Abilene, and Callihan, and is about 2 miles east of a dry hole drilled by Magnolia Petroleum Co. 16 years ago. That test went to 3,785 feet, proving dry.

Jones County

Eastern Jones County is to receive a wildcat test, which will be drilled by N. H. Martin & Son, of Wichita Falls, who already have considerable production in this county. Location is on the Mary and E. B. Spurrier farm in the W. C. Walker Survey, north of the Sandy Ridge, and Higgs pool in the eastern part of the county. Contract calls for a 2,100-foot hole.

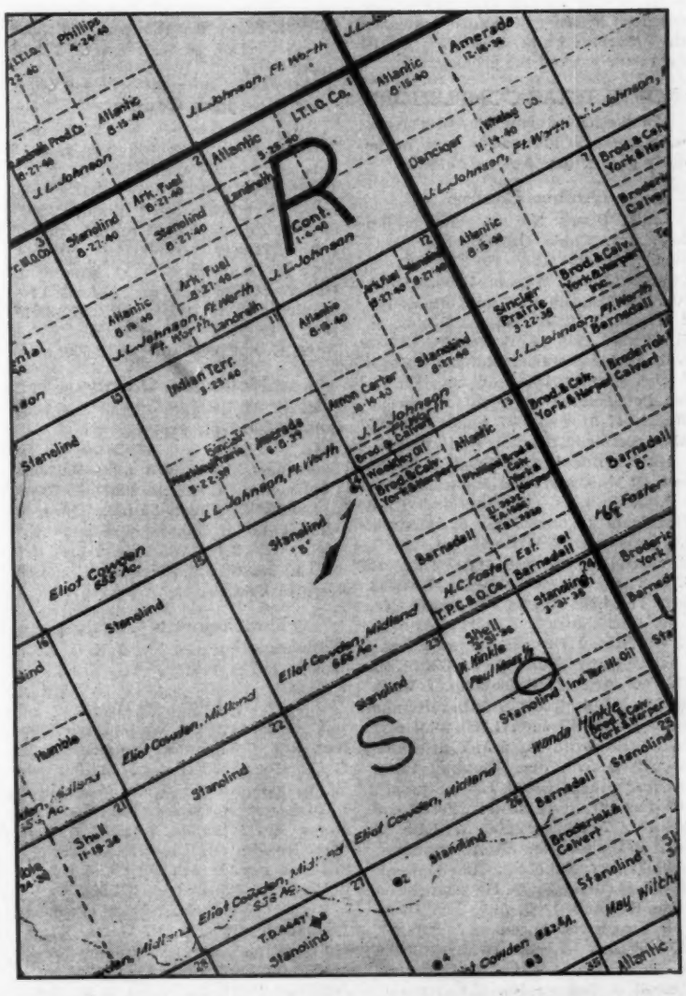
Jones County is one of the most active counties in the West Texas district, the Hawley and Lueders pool seeing most of the development being carried on in the county, although several wildcats are always busy in various parts of the county. Nine of the 55 locations staked in the West Texas district this week were recorded for Jones County, where production is obtained from 1,500 to 2,200 feet in depth, the oil being of high gravity. Drilling is easy and therefore comparatively cheap, with independents and small companies doing practically all of the developing. The Sinclair Prairie Oil Co., which owns production in the Hawley pool, is drilling its leases there.

An abandonment was marked up southeast of the Hawley pool this week when Humphrey No. 1 Mrs. Ella Duke, in the Gabriel Martinez Survey No. 195, proved dry at a total depth of 2,465 feet. It marks the southeast edge of the field.

Ector Wildcat

Dunning and others No. 1 Cummins, a wildcat located in the SE quarter of section 33, Block 45, Township 1n, T.&P. Survey, 4 miles south of production in section 10, 3 miles southwest of production in section 18 and the same distance west of production in section 20, both in Block 44, Township 1n, and 4 miles northwest of production in the Goldsmith field, is showing for a producer and either a new pool opener or an extension to any one or all of the aforementioned areas, which is to be proven later.

It logged the lime pay from 4,244-57 feet and shut down at the latter depth to run 7-inch casing. Six hundred feet of oil was standing in the hole when it shut down, and it is certain of making a producer, opening more producing territory for the northwest corner of Ector County.



Map showing 2-mile northwestern extension to the Odessa or Foster pool in eastern Ector County. A lone producer, 3 miles farther north, may be connected with the Odessa pool

(Map courtesy Zingery Oil Map Co., Fort Worth, Tex.)

Winkler Extension

Wahlenmaier and Atlantic Oil Producing Co. No. 1-A Leck, in the SW quarter of section 34, Block 74, P.S.L. Survey, mentioned last week as extending production another mile to the north of the Hendricks and Sayre-Howe areas in northern Winkler County, flowed 1,800 bbls. of oil in 11 hours at a total depth of 3,070 feet and will probably be completed at this depth. The pay was topped at 3,034 feet. It is 1 mile north of two large wells completed by Henderson and the Uscan Oil Co. in sections 9 and 10, and will cause heavier drilling on this trend and in the extended area.

An even dozen tests were completed in Winkler County this week, one outpost test in the Halley area, proving dry. This and Ward County are the two most active counties in the entire district, and have been for the past year, with extensions being completed in the various producing areas often to open more territory to production and cause more and new drilling.

Water Level Found

Gulf Oil Corp. No. 6 Goldsmith, 1 mile northwest of the discovery well, and located in section 4, Block 44, Township 1s, T.&P. Survey, a south offset to the Dunning discovery or extension producer north of the Goldsmith field in western Ector County, drilled into sulfur water at 4,250 feet and was plugged back to 4,225 feet and is flowing around 250 bbls. of oil per day. This total depth is about 50 feet below the Dunning producer. Pay was topped in the Gulf well at 4,176 feet, corresponding with the Gulf-Goldsmith discovery well 1 mile to the south. The new producer will be given a shot or acidized, or both, to step up the production. It was drilled into water purposely in order to define same for the area.

Ward Wildcat Completion

The extension well of Richardson Oils, Inc. on the Hathaway ranch, in section 37, Block 34, H.&T.C. Survey, which last week marked nearly a mile southwest extension to the southern Ward County producing area, was completed this week for a 12,000,000-foot gasser at a total depth of 2,275 feet. The gas pay was logged at 2,171 feet, and elevation is 2,599 feet.

Pipe Line Connection

The Shell Pipe Line Co. has connected to the Rotan pool in Fisher County, in which the Tide Water Oil Co. and Merry Brothers and Perini

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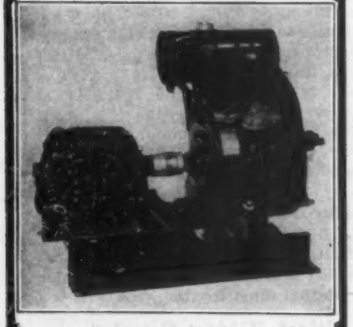

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have two producers. This is the first pipe line outlet for the pool opened in February of last year, crude from the wells having previously been trucked to small refineries at Sweetwater and Lubbock.

Ranger and Wichita Falls

E. P. Campbell of Abilene is spudding on his No. 1 K. K. Morrisett, in section 68, Block 14, T.&P. Survey, 10 miles east of Abilene and over in Callahan County. This wildcat is to go to 1,700 feet. Another wildcat for this area is to be drilled by Wittmer Oil & Gas Properties on the I. N. Jackson ranch, in section 95, Block 12, T.&P. Survey.

There were 60 locations staked in the Wichita Falls district this week and 50 tests were completed. Recent rains have filled tanks and reservoirs so that there is plenty of water for drilling, many rigs having been shut down in the district for several weeks due to lack of drilling fluid.

The Specialty Oil Co. of Dallas and the Brown and Hancock Oil Co. are to sink a 3,000-foot test 2½ miles southwest of the Pioneer pool in Brown County, expecting to pick up production in the Caddo lime around 2,400 feet. This test adjoins a block on which a test previously drilled had production in the Ranger at around 3,000 feet, and this test will seek that production if it missed production in the Caddo. The test is located on the Harrell Block, although it is on the McDonald lands in the southeast 80 acres of the Jordan Hill Survey, located on a major structure drawn on the Marble Falls lime. J. F. A. Schlueter worked the geology.

NORTH TEXAS COMPLETIONS

Completions during the past week, with their sand records and initial daily production were as follows:

Archer County

L. T. Burns No. 10 Parrish, 691 feet, dry. Cable Oil Co. No. 11 C. Webb, 663-93 feet, 10 bbls. C. B. Christie No. 4 Wilson, 1,606-10 feet, 50 bbls. Consolidated and others No. 4 Wilson, 2,222-42 feet, 1,200 bbls. H. H. Fraser No. 11 Wilson B, 877-81 feet, 10 bbls. Hamer & Scholl No. 4 Archer County, 990 feet, dry. Hamilton Petroleum Co. No. 37 Abercrombie, 1,147-76 feet, 15 bbls.; No. 39 Abercrombie, 1,160-63 feet, 10 bbls.

Harry Hines No. 4 Ward A, 937-44 feet, 67 bbls. Morrison & Jackson No. 3 J. J. Perkins, 655 feet, dry. Pace Petroleum Co., Inc. No. 1 J. Darokek, 1,475 feet, dry. Wilson-Ligon No. 1 M. B. Kolb, 1,397 feet, dry. Producers S. & T. Co. No. 6 Neimeyer, 1,440-43 feet, 114 bbls. White & Duncan No. 1 H. O. Prideaux, 730 feet, dry. D. L. Wolf No. 1 Hasson, 961 feet, dry.

L. T. Burns No. 1 A. J. White, 1,210 feet, dry. C. Crosby No. 1 M. B. Ray, 1,135 feet, dry. Fain McGaha No. 1 Belle Wisdom, 1,393 feet, dry. Golding Cochran No. 5 J. T. Richardson, 1,300 feet, dry. Golding Cochran and others No. 3 J. C. Stinnett, 740 feet dry. Hamilton Petroleum Co. No. 7 Abercrombie-A, 1,162-82 feet, 15 bbls.; No. 38 Abercrombie, 1,150-60 feet, 65 bbls.; No. 3 Ward, 1,054 feet, dry. H. D. Hardegree No. 1 Gus Symank, 1,460 feet, dry. Junker & Brown No. 1 Junker & Kunkel, 1,235-43 feet, 75 bbls. H. M. Kelleher No. 1 B. O. Watson, 775 feet, dry. Kimbell & Bohner No. 8 Carpenter, 1,052-63 feet, 5 bbls.; No. 9 Carpenter, 1,050-59½ feet, 50 bbls. C. B. Long No. 9 J. H. Turbeville, 1,490-95 feet, 15 bbls. Morrison & Jackson No. 2 J. J. Perkins, 730 feet, dry. Magee & Stipe No. 6 Mrs. B. Garrett, 726 feet, dry. I. B. Perskey No. 4 Scott, temporarily abandoned location. Texas Co. No. 2 J. R. Garvey, 830 feet, dry.

Baylor County

Consolidated Oil Co. No. 1 Portwood BB, 1,416 feet, dry. Petroleum Production Co. No. 31 Portwood, 1,422 feet, dry.

Petroleum Production Co. No. 30 Portwood, oil show from 1,389-1,404 feet, 25 bbls.

Cooke County

Larkum & Warr No. 2 V. D. Randall, 1,793-1,803 feet, 2 bbls.; No. 1 Spires, 2,056 feet, dry. J. H. Masterson No. 1 R. J. Timmis, 1,975 feet, dry. Fain-McGaha Oil Corp. No. 2 Joseph Hofbauer, 1,710 feet, dry. Harrison-Dillard, Inc. No. 4 R. W. Trew, 1,098-1,113 feet, 130 bbls. F. W. Merrick, Inc. No. 3 G. T. Andress, 1,524 feet, dry. Murray Investment Co. No. 1 Fred Herr, 1,317 feet, dry; No. 7 Lee Rohmer, 1,000 feet, dry. Schermerhorn Oil Corp. No. 3 Mary A. Kessler, 826-92 feet, 15 bbls. United Producers Co. No. 1 J. W. Mount, 1,801 feet, dry.

Bridwell Oil Co. No. 2 Trew-B, 1,807 feet, dry. Glover Faubion and others No. 2 Andress, 200 feet, temporarily abandoned. F. W. Merrick, Inc., No. 29-A Knabe, 817-29 feet, 25 bbls. L. E. Rader No. 1 S. McCubbin, 1,722 feet, dry. Ruwaldt-Couch No. 2 Trew, 686-703 feet, 25 bbls.; No. 3 Trew, 690-754 feet, 25 bbls. Texas Co. No. 10 Waltercheid, 723-55 feet, 10 bbls.

Jack County

Gwynn & Overbey No. 2 Beezley, 3,010-26 feet, 12,500,000 feet gas, 15 bbls. oil. Iron Mountain Oil Co. No. 2 Bridwell, 2,998-3,000 feet, 425 bbls. Nelson Syndicate No. 1 McCoy, 2,961-92 feet, 15 bbls. Ray & Staniforth No. 1 L. J. Hester, 2,985-96 feet, 60 bbls.

C. L. Gannaway No. 1 Mrs. S. J. Christian, 730 feet, dry. Lewis Production Co. No. 1 Bryson, 2,975-3,015 feet, 340 bbls. O. J. Perrin No. 1 Nora Kee, 2,984-3,010 feet, 600 bbls.

Montague County

M. C. Wells and others No. 1 J. Collier, 300 feet, dry.

O. V. Beck No. 18 Mrs. C. H. Davenport, 1,474-1,515 feet, 50 bbls. Continental Oil Co. No. 28 N. J. Howard, 1,153½-79 feet, 35 bbls. Lesh & McCall No. 3 Cunningham and others-A, 929-72 feet, 35 bbls. Texas Co. No. 10 R. W. Cunningham-A, 909-17 feet, 45 bbls.

Throckmorton County

Bearman Oil Co. No. 2 Kirk Ledbetter, 780 feet, dry.

Wichita County

J. A. Coker No. 1 W. L. Doyle, 500 feet, dry. Coleman & Coppock No. 1 G. A. Hoge, 835-41 feet, 12 bbls. G. W. Cooper No. 38 J. L. Waggoner, 1,326 feet, dry. Fain-McGaha and Leo Moore No. 1 Gibson, 1,914-35 feet, 5 bbls. Rathke Oil Co. No. 19 Peeler, 873 feet, dry, Worth Oil Co. No. 3 J. L. Jackson, 633-43 feet, 3 bbls.

Butex Oil Co. No. 1 W. C. Parker, 1,856 feet, dry. F. M. Gates No. 1 Hall, 800 feet, dry. A. Holston No. 2 J. L. Jackson, junked at 520 feet. Jennings Drilling Co. No. 3 G. Jennings-A, 958-68 feet, 5 bbls. Marc Co., Inc., No. 1 Whittenbach, 1,919-37 feet, 20 bbls. W. B. Omohundro No. 4 Gibson-A, 1,831-51 feet, 21 bbls. Rathke Oil Co. No. 11 Burnett, 385 feet, dry; No. 12, 685-91 feet, 10 bbls.; No. 13, 703 feet, dry. Ray & Staniforth No. 2-A Robinson-A, 1,209 feet, junked. Turman Oil Co. No. 25 Waggoner, 2,211 feet, dry. Waggoner Refining Co. No. 6 Waggoner-AA, 1,570-1,604 feet, 100 bbls.

Wilbarger County

Fain-McGaha Oil Corp. No. 9 Waggoner Y, 2,397-2,412 feet, 20 bbls.

Bason Drilling Co. No. 2 Waggoner-A, 2,590 feet, dry. Fain-McGaha Oil Corp. No. 6 Waggoner-Y, 2,391-2,412 feet, 125 bbls. Lawson & Leavell No. 5 Waggoner-A, 1,430-46 feet, 125 bbls.

Young County

Atchley & Shira No. 1 Benson A, 886-96 feet, 85 bbls. Jake Bundy No. 1 J. B. Foster, 600 feet, dry. Duncan & Holt No. 10 Benson, 909-17 feet, 150 bbls. Hunter Oil Corp. No. 7 J. M. Bloodworth A, 1,082-95 feet, 2 bbls. Lee Kimmell & Co. No. 10 F. M. Cullers, 549-70 feet, 20 bbls. Ray & Staniforth No. 1 Wootten, 3,815-3,961 feet, 12 bbls. Sams & Kubecka No. 2 F. M. Cullers, 665 feet, dry. Solo Oil Co. and others No. 8 Stowe, 1,128 feet, dry. Underwood & Campbell No. 6 Campbell E, 865-79 feet, 70 bbls. Wootten & Wilson No. 1 Scott, 843 feet, dry. Pitzer & West No. 1 Thornton Adams, 4,433 feet, dry.

Alexander and others No. 1 Hausler, 1,093 feet, dry. L. T. Burns No. 5 Andrews, 901-34 feet, 15 bbls.; No. 1 C. E. Braune, 1,265 feet, dry. Roy I. Carter No. 1 Hamilton, 1,000 feet, dry. Chambers & Humphreys No. 2 Benson, 896-906 feet, 100 bbls. C. C. Counts No. 1 W. E. Edwards, 1,214-15 feet, 35 bbls. Duncan-Holt No. 9 Benson, 894-903 feet, 185 bbls. Griffin Oil Co. No. 1 Morrison, 1,090 feet, dry. E. C. Jeffery No. 3 Carpenter, 1,025-39 feet, 3 bbls. Kimmell Lea & Co. No. 9 F. M. Cullers, 544-59 feet, 10 bbls. Moran & Wotola No. 9 Howard, 902-18 feet, 186 bbls. Solo Oil Co. No. 2 Hausler-A, 1,070-75 feet, 5 bbls.; No. 7 O. B. Stowe, 1,085 feet, dry. Christie Brothers No. 1 Primitive Baptist Church, 3,812-54 feet, 15 bbls. McLester & Dobbs No. 1 Laquey, 4,112-26 feet, 250 bbls.

PANHANDLE COMPLETIONS

Carson County

Ryan Consolidated Oil Co. No. 11 Block, 3,108-62 feet, 594 bbls. pumping; shot with 580 quarts. United Crude Oil Co. No. 4-C Cooper, 2,962-3,070 feet, 1,070 bbls. pumping, shot with 510 quarts.

Gray County

Christie and Hickman No. 1-A E. E. Gethings, 2,615-2,718 feet, 314 bbls. pumping, shot with 490 quarts. Empire Gas & Fuel Co. No. 8 Shields, 3,148-3,225 feet, 571 bbls. pumping, shot with 400 quarts. Lefors Petroleum Co. No. 3 Bruce Bull, 2,860-2,903 feet, 357 bbls. pumping. Magnolia Petroleum Co. No. 3 E. Haggard, 3,225-91 feet, 503 bbls. pumping, shot with 330 quarts. Reiger and others No. 2 Combs-Worley, 2,840-3,060 feet, plugged back to 3,000 feet, 20 bbls. pumping, shot with 430 quarts. Shell Petroleum Corp. No. 2-A Saunders, 2,803-2,952 feet, 482 bbls. pumping, shot with 500 quarts and 800 quarts.

Hutchinson County

Gulf Oil Corp. No. 5 Pitcher, 3,065-3,170 feet, 398 bbls. pumping, shot with 480 quarts. McIlroy Oil Co. No. 1 Mrs. S. Hardin, 3,025-97 feet, 172 bbls. pumping, shot with 440 quarts;

No. 1 Johnson, 3,030-98 feet, 198 bbls. pumping, shot with 400 quarts. Owl Oil Co. No. 2 Moore, 3,115-48 feet, 644 bbls. pumping, shot with 950 quarts. Paloma Oil Co. No. 3 Lewis, 2,900-3,081 feet, 746 bbls. pumping, shot with 990 quarts. Harry Stekoll No. 6-H Whittenberg, 2,868-2,982 feet, 437 bbls. pumping, shot with 240 quarts.

Moore County

Shamrock Oil & Gas Co. No. 2-C Robertson, 3,190-3,565 feet, plugged back to 3,537 feet, 8,900,000 feet of gas.

Wheeler County

B. G. Barnett No. 2 Patterson, 1,932-2,160 feet, plugged back to 2,130 feet, 10,800,000 feet of gas, shot with 120 quarts. Barnes and Green No. 1 George, 1,975-2,045 feet, 48,660,000 feet of gas. J. Gordon Burch No. 3 Plummer, 2,427-2,524 feet, 38 bbls. pumping. Teci Production Corp. No. 1 Stewart, 2,066-2,248 feet, plugged back to 2,105 feet, 2,250,000 feet of gas.

WEST TEXAS COMPLETIONS

Crane County

Gulf Oil Corp. No. 132 McElroy, 2,760-2,952 feet; shot; 1,014 bbls.

Crockett County

The California Co. No. 6 Shannon, 2,460-2,547 feet, 220 bbls. oil and 110 bbls. water.

Ector County

Stanolind Oil & Gas Co. No. 30 Cowden, 4,068-4,276 feet, shot, 500 bbls. Skelly and others No. 3 Scharbauer, 3,500-3,672 feet, shot, 360 bbls.

Sun Oil Co. No. 5-A Wight, 4,135-4,275 feet; shot; 892 bbls. Sinclair Prairie Oil Co. No. 1 University, 3,472-3,659 feet; shot; 206 bbls.

Fisher County

General Crude Oil Co. No. 5 Willingham, dry and abandoned at 3,162 feet; plugged back to 3,128 feet and acidized; elevation 1,795 feet.

Garza County

M. L. Richards No. 1 Post Estate, total depth 2,920 feet, 70 bbls.

Glasscock County

Fleetborn Oil Co. No. 1 Dodson, dry and abandoned 3,247 feet, elevation 2,714 feet.

Howard County

Sinclair Prairie Oil Co. No. 36 Dodge Estate, 2,495-2,770 feet, shot, 790 bbls.; No. 37 Dodge Estate, 1,925-2,820 feet, shot, 373 bbls.

Merrick and Lamb No. 2 Clay, total depth 3,215 feet; shot; 50 bbls.

Jones County

Bridwell & Fikes No. 1-B Jennings, total depth 1,950 feet; 103 bbls. of oil and 41 bbls. of water; No. 6 Jennings, 1,948 feet; 115 bbls. Peckham and Danciger Oil Refining Co. No. 1-B City of Stamford, 1,932-2,066 feet; 180 bbls.

Humphrey No. 8 Dorsey, 2,220-2,225 feet, 30 bbls.; No. 11 Dorsey, 2,214-2,217 feet, 676 bbls. in three and one-half hours. Lash & McCall No. 1 Jennings, 2,068-2,073 feet, 240 bbls. Fain & McGaha No. 1 Hayden, dry and abandoned 2,335 feet. Danciger and Peckham No. 1 White, dry and abandoned 2,303 feet.

Pecos County

A.B.C. Oil Co. No. 1 Gregg, 1,468-80 feet; shot; 353 bbls.

Black and others No. 2 Gregg, dry and abandoned 1,576 feet, elevation 2,430 feet. Baker No. 2 Sinclair-Douglas, 390-460 feet, 3 bbls. Stanolind Oil & Gas Co. No. 18-B Tippett, 353-388 feet, 45 bbls. oil and 2 bbls. water.

Martin County

Woodley Petroleum Corp. and others No. 1 M. S. King, dry and abandoned 3,660 feet, elevation 2,667 feet.

Scurry County

Bristow & Cantrell No. 1 Shannon Estate, dry and abandoned 3,706 feet, elevation 2,552 feet.

Upton County

Choate & McCamey No. 1 Cordova-Union, 2,165-70 feet; shot and acidized; 45 bbls. of oil and 45 bbls. of water.

Ward County

Gibson and others No. 2 Sloan, 2,280-2,750 feet, plugged back to 2,350 feet, 72 bbls. in 12 hours. Elliott & Hardesty No. 4 Wallis, 2,285-2,627 feet, shot. 305 bbls. Gulf Oil Corp. No. 52 Hutchens, 2,694-2,753 feet, shot, 439 bbls. The California Co. No. 2 Adams, 2,408-2,450 feet, shot, 4,500,000 feet of gas. Richardson No. 1 Hathaway, 2,171-2,275 feet, elevation 2,599 feet, 12,000,000 feet gas.

Turman Oil Co. No. 6-B Shell-Sloan, 2,885-3,050 feet; 617 bbls. Rio Bravo Oil Co. No. 3 Alcott, 2,379-2,530 feet; shot; 1,681 bbls.; Mid-Continent Petroleum Co. No. 1 Pitts, 2,240-2,393 feet; shot; 253 bbls. Bond and Harrison No. 2-A Maxwell, 2,330-2,530 feet; shot; 3,461 bbls.; No. 1-A Maxwell, 2,280-2,530 feet; shot; 4,861 bbls. Tex-Mex Oil Co. No. 1-A State River Bed, dry and abandoned at 2,425 feet; shot; elevation 2,434 feet.

Winkler County

Humble Oil & Refining Co. No. 6-A Walton, 2,945-3,180 feet; shot; 339 bbls.; No. 5 Howe, 2,853-3,020 feet; shot; 1,497 bbls.; No. 2-D Walton, 2,792-2,993 feet; shot; 435 bbls. Westbrook No. 7 Daugherty, 2,775-2,983 feet; shot; 1,050 bbls.; Skelly Oil Co. No. 9 Halley, 2,770-2,880 feet; shot; 509 bbls. Illinois Oil Co. No. 1 Central State Bank of Abilene, 2,911-3,116 feet; shot; 283 bbls. Henderson No. 2-B Walton, 3,012-51 feet; 1,689 bbls. a day through three-quarters inch tubing choke.

Maxwell and others No. 2 Walton, 2,719-3,159 feet, shot, 238 bbls. Amerada Petroleum Corp. No. 3 Walton, 3,164 feet, shot, 219 bbls. Texas Pacific Coal & Oil Co. No. 1 Brown & Atlantic, 2,800-3,160 feet, shot, 212 bbls. Richardson No. 3 Walton, 3,365-3,550 feet, shot, 672 bbls. oil and 128 bbls. water. Estell No. 1 Halley, 2,808-2,907 feet, plugged back to 2,892 feet, shot, 232 bbls. Gulf Oil Corp. No. 68 O'Brien, 3,097-3,235 feet, shot, 293 bbls. Humble Oil & Refining Co. No. 4 Howe, 2,850-2,985 feet, shot, 1,523 bbls. Sinclair Prairie Oil Co. No. 2-B Cummins, 2,915-2,988 feet, shot, 606 bbls. Superior Oil Co. No. 1 Hill, dry and abandoned 3,155 feet, elevation 2,761 feet. McCurdy and others Pure-McCutchen, 2,771-2,968 feet, shot 1,135 bbls. Tide Water Oil Co. No. 1 Walton 2,858-2,953 feet, shot, 1,385 bbls. Mid-Continent Petroleum Corp. No. 1 Walton, 2,800-2,980 feet, shot, 1,413 bbls.

Eastern Fields

(Continued from Page 134)

Guyandotte River. In Guyandotte district, the National Gas Corp. is building a rig on the F. L. Whitaker farm on the Right Fork of Four Pole Creek.

In Calhoun County, several wells are drilling. In Sheridan district, Ferrell and Cain have started drilling on the Lucy Haverty farm. In Lee district, the Rosedale Oil & Gas Co. is drilling on the Virginia Stockwell farm. The Ohio Valley Gas Co. is down 875 feet on the Charles Starcher farm. H. S. Adams and others have reached 1,575 feet on the J. L. Stump test. Guy Boggess and others are in the sand in the test on the Maude Altizer farm. In Washington district, Jeff Miller and others are building a rig for a test on the H. G. Brannon and others farm. The Clark Drilling Co. is down 1,430 feet in a test on the Perry Meadows farm. Massey and Jarvis are drilling at 1,752 feet on the C. B. Parson farm.

In Clay County, the South Penn Oil Co. has made a location for another well on the O. D. Stockley farm in Henry district. In Fayette County, Godfrey L. Cabot, Inc. is down 563 feet in No. 7 on the Kanawha Gauley Coal Co. lease in Falls district.

In Gilmer County, the McCall Drilling Co. has a rig standing for a second test on the J. J. Hardman farm in DeKalb district. In Center district, H. B. Scott is drilling at 365 feet, the test on the Doy McClain farm.

In Kanawha County, the United Fuel Gas Co. has made a location for No. 4,640 on the Mohler Lumber Co. tract on Dicks Creek in Washington district. This is the second well on this tract in the county with additional ones in adjoining counties.

In Lincoln County, this company has a location for No. 4,655 on the same tract on Ivy Creek in Washington district, and No. 4,610 is being rigged up on the same tract. In Sheridan district, the Eustace Gas Co. is rigging up the test on the Owen Bias farm.

In Logan County, the Boone County Coal Co. has made a location for No. 8-H on its own property on Rockhouse Branch. No. 7-G in Logan district is in the sand and showing for about 400,000 feet a day.

In Monongalia County, the Philadelphia Oil Co. has made a location on the J. J. Moore farm in Clay district. In Battelle district, the Hope Construction & Refining Co. is down 3,000 feet deepening the No. 570 on the Henry S. Shriver farm and are making a road to the location on the C. L. Eakin farm.

In Marshall County, the Manufacturers Light & Heat Co. is down 1,460 feet on the V. B. Pyles farm in Liberty district. The Pittsburgh Coal was at 930 feet. Here, the Valley Run Oil & Gas Co. is moving in the tools on the C. Yoho farm.

In Raleigh County, Godfrey L. Cabot, Inc. is making a road to a location for a test on the Rock House Fork Land Co. tract on Surveyor Creek in Trap Hill district.

In Wetzel County, the Hope Construction & Refining Co. has made a location on the James M. Allen farm on Fishing Creek in Grant district. In Tyler County, this company is building rig on the Charles B. Booher farm in McElroy district.

In Wirt County, J. J. Shore has rig up for a second test on the Laura Mayle farm in Clay district. In this district, W. C. Patterson is ready to drill the No. 27 on the J. C. Hale farm.

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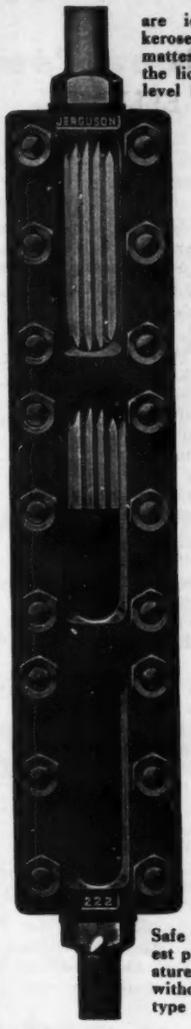

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Michigan Field Report

OPEN FIELD NEAR BAD AXE 50 MILES EAST OF PORTER

By
PAUL A. ELLIOTT

MUSKEGON, Mich., May 18.—After two comparatively quiet weeks in Michigan oil developments, a new field was opened in Grant Township, Huron County, about 50 miles east of the Porter field in the thumb district near Bad Axe.

Wallace Markle No. 1 Frank Opaka, NE NE SE section 4-15n-11e, was the new producer in which Dundee oil estimated good for 200 bbls. a day was encountered at 3,007 feet. Operations were suspended immediately to install pumping equipment as insufficient gas was found to flow the oil.

The Opaka well previously had indicated success with a good show in the Upper Traverse. It was drilled by Caster Brothers, contractors, and is the first producer of commercial size in this area.

Prospects of a new field, slightly increased average daily crude production and continuing success in natural gas developments in several central Michigan fields but principally in the Millbrook-Hinton-Belvidere, or Tri-Townships fields of Mecosta and Montcalm Counties, brought new hope to both oil and gas operators.

Midland County

In Midland County, where the daily output increased 1,666 bbls. during the week ended May 9 offsetting losses in other fields, four producers were completed and four more were nearing completion.

Pure Oil Co. No. 7 Bond-Root, previously drilled into the Dundee pay sands, last week developed into the largest oil producer recently completed in the state when it flowed about 1,350 bbls a day natural from the Traverse formation. It was drilled to 2,936 feet. It is located C N half SW NE section 3-13n-2w, Jasper Township, Midland County.

The nearby Pure No. 6 Bond-Root, C N half NE SE, same section, one location south of the No. 7, made about 125 bbls. natural at a depth of 3,440 feet and increased to 200 bbls. daily after acid treatment.

Marshall H. Bauman No. 2 Charles and Henrietta Long, NW NW NE section 19-13n-1w, Porter Township, started flowing at the rate of 40 bbls. an hour and was estimated good for upwards of 400 bbls. It was drilled to 3,420 feet.

Ward J. Blunt No. 1 D. E. Harrison in section 18-14n-2w, Greendale Township, was completed as a 150-bbl. initial producer in the Dundee when placed on the pump after swabbing. It may be acidized later. Pure Oil Co. No. 5 Arthur N. Ward, SE SW SE section 7, Greendale, also failed to flow and when drilled into the Dundee at about 3,580 feet and will be treated.

Hubbell Oil Producing Co., Inc., No 1 Edward Bernard, N NW SW section 10, Greendale, also was nearing Dundee completion.

Flynn and Larsen No. 1 Green, section 13, Jasper, was rated a 50-bbl. initial producer after acid treatment.

Pure No. 4 Frank Howland, SE NW NW section 23, Porter Township, was nearing completion drilling at about 3,350 feet.

King Drilling Co. No. 1 George Gould, previously drilled into the Dundee formation in this comparatively new producing area, was being treated with acid after a shot of nitro which brought water with oil.

Mid-State Development Co. No. 1 John Bohn, section 16, Greendale Township, was increased to 40 bbls. a day with acid, or about triple its previous maximum production since completion a year ago.

Crystal—Montcalm

Three producers and two dry holes were completed or drilled into the Dundee and about to be finished in the Crystal and nearby Vickeryville areas in Montcalm County.

McClanahan Oil Co. No. 2 Frank H. Lamphier, SE SW NE section 2-10n-5w, Crystal Township, flowed at the rate of about 250 bbls. but was to be retreated at 3,187 feet. It made about 125 bbls. daily natural.

Rowmor Corp. drilled into the Dundee in its No. 1 Frank Lamphier on an adjoining section of the same farm, NE SW NE section 2, with no report of initial production but prospects of commercial output this week.

A dry hole was reported by J. W. Leonard, Jr., trustee, in the No. 5 C. R. West Estate, SE SE NW section 11, Crystal, completed at 3,202 feet after a show at 3,200 feet.

Daily Crude Oil Co. No. 3 John Flint, NE SW SE section 35-11n-5w, Ferris Township, was being treated before completion, while the Burnstein Oil & Gas Corp. No. 7 Keel, SE NE SE section 35, same township, had struck the pay sands and was to be acid treated at about 3,195 feet.

Rowmor Corp. No. 1 J. Tow, NW NW NE section 36-10-6w, Evergreen Township, an extension test less than 2 miles north of the Jetter-Lima-Long No. 1, or Vickeryville well, was dry in the Dundee and to be abandoned. It was drilled by Daily Crude Oil Co as contractors. Old Dutch recently abandoned the No. 1 Russell in section 27, Evergreen.

United Producers Oil & Royalty Co. No. 2 Ernest and Martha Conners, NW SW NW section 26, Ferris Township, has been temporarily abandoned at about 1,300 feet.

Two Crystal Township tests nearing completion were Stork Oil Co. No. 7 George and Etta Dickenson, NW SW SE section 3, and J. W. Leonard, Jr., Trustee, No. 1 Maud Hoover, SW NE NE section 11. Jetter Oil Co. also was completing the No. 1 Laurence Pitcher, SE SE NW section 5, an extension test.

Dougherty & Markey, Inc., were casing their No. 3 Fisher, SE SW SW section 36, Ferris Township.

Two Montcalm County wildcat tests for oil near the Vickeryville well also were near completion, namely: Jetter Oil Co. No. 1 C. McCracken, NW SE SE section 6-9n-5w, Bloomer Township, more than 3,000 feet deep, and Michigan Oil & Gas Co. No. 1 F. Youngs, NE NW SW section 1-9n-6w, Bushnell Township, about 2,900 feet deep, a quarter mile west of the Jong well.

Star Petroleum Corp. was recementing 5-inch casing in the No. 1 James Ward, NE NE NW section 20, Bloomer Township, after water broke in through split casing at 3,135 feet. The test is in the Dundee.

McClanahan Oil Co. No. 1 Lincoln National Life Insurance Co., SW SW NW section 29-12n-5w, Richland Township, continued drilling toward oil after cementing off 5,000,000 feet of gas.

Daily Crude Oil Co. is completing No. 6 H. P. Christensen, SE NW NE section 10-12n-6w, in the Home Township, Montcalm County field.

Of two other Montcalm County wildcats, one was dry and the other reported a show of gas soon to be tested in the Michigan Stray sands.

The former was Stewart-Atha, Inc. No. 1 Morgan, C SW SE section 9-12n-9w, Winfield Township, a gas test and the latter was Durham & Jones No. 1 Delos A. Towle, SE SE NW section 15-11n-8w, Pine Township, in which casing was run to drill in at about 1,180 feet.

Beaverton—Gladwin

The Beaverton field in Gladwin County struck a setback last week when the Mammoth Petroleum & Refining Co. No. 1 Abbie Mellinger, SE NE SW section 35-18n-2w, one of three Grout Township extension tests, encountered water 73 feet in the Dundee at about 4,000 feet. It will be plugged and abandoned marking a limit about a mile north of the Great Lakes-Campbell producer in section 3, Beaverton Township.

Charles Bell No. 1 R. Ross, SE SE SE section 34, Grout Township, also was expected to test the Dundee this week about half a mile north of the Campbell well. It was about 3,700 feet deep.

Smith Petroleum Co. No. 3 Mae E. Fruchey, SE SE SW section 2-17n-2w, Beaverton Township, also was nearly 3,700 feet deep and soon to complete.

M. F. Whitehill, who opened the Beaverton field, has made three new locations on proved or extension locations.

Ogemaw County

Three tests were being completed in Mills and Ogemaw Townships, Ogemaw County, last week, all with oil shows indicating commercial production but all to be acidized.

Melling Oil & Gas Co. was completing two tests on a state of Michigan lease, both in Mills Township. The one was the No. 4 State recently deepened from the Traverse and the other was the No. 7 State, SE NE NW section 6-21n-3e. Both were 2,610 feet deep and estimated good for 25 bbls. each natural.

McClanahan Oil Co. was ready to place its No. 2 Frank and Joseph Heintz, NW NE NE section 24-22n-1e, Ogemaw Township, on the pump after a good show before acid treatment. It is about 2,790 feet deep. McClanahan is starting a new test on an adjoining lease.

Ogemaw Crude Oil Co. also was nearing completion of its No. 1 Frank Baumchen, NW NW SW section 27-22n-2e, West Branch Township.

Isabella County

Two Rolland Township wildcat tests were nearest to completion of about 10 projects in Isabella County.

George Hanners and others No. 1 J. Dargitz, SW SW SE section 30-13n-6w, Rolland Township, was drilling below 3,100 feet after a show of oil and gas in the Traverse. It will be carried at least to the Dundee. Pure Oil Co. No. 1 Chris and Lena Comstock, NE SW SW section 15, same township, was drilling below 3,400 feet. Both were expected to complete this week.

McClanahan Oil Co. No. 1 John L. Ettinger, SW NW NW section 34-15n-3w, Denver Township, also was more than 3,100 feet deep with early completion expected.

Saginaw County

Mid-State Development Co. plugged and abandoned the No. 1 A. J. Burleson, section 21-10n-5e, Taymouth Township, as dry at 2,857 feet running into water within 3 feet of the first show and about 160 feet in the Dundee.

B. J. Skinner No. 1 Alger Sheldon and others, SE SE SW section 11-10n-3e, St. Charles Township wildcat, was expected to drill into the Traverse this week. St. Louis Pipe & Supply Co. No. 1 John Yadovack, SE NW SE section 13-10n-2e, Brant Township, was still treating in an attempt to make commercial production, while Lewis Burr No. 1 Susan Palmer, NE NE NW section 19-10n-6e, Birch Run Township, was to be drilled into the Berea soon.

Cardinal Crude Oil Corp. No. 1 J. J. Haviland, SE SE SE section 31-5n-3e, Antrim Township, Shiawassee County, was getting ready for a shot in the Berea.

West Michigan

Drilling was temporarily suspended in James H. Barton No. 1 test in

Nelson Township, Kent County, at a depth of 2,512 feet. Another test soon will be started for the same operators in section 30, Spencer Township, on the Otto Perry lease.

Michigan Oil Exploration Co. No. 1 George W. Croff, NE SW NW section 35-7n-9w, Vergennes Township, near Lowell, will be drilled to the Sylvania after failure in upper formations. It is now more than 2,600 feet deep.

Drilling operations have been resumed in Muskegon County's only active test, the Jacob Bolema and Overland Petroleum Co. No. 1 Mary Bolt, SE NW SE section 10-10n-13w, Casnovia Township, where it was necessary to skid rig and start a new hole.

Wildcat Tests

Lee Brown No. 1 S. Spicer, SW SW SW section 6-2s-8e, Canton Township, Wayne County, was reported nearly 4,200 feet deep.

McPherson and Co. No. 1 George Sharrar, NE SW SW section 11-11n-4w, Sumner Township, Gratiot County, which reported a show in Traverse two weeks ago, is on the way to the Dundee and more than 3,100 feet deep. The show was struck at 2,855 feet so testing of the Dundee is expected soon.

M. J. Ingold No. 1 Dr. J. Miller Estate, NW SW NW section 23-26n-11w, Blair Township, Grand Traverse County, is more than 2,000 feet deep as a Northwest Michigan test.

Two Ionia County tests were more than 2,500 feet deep and expected to test possible pay sands soon. They are: Terry Dale Michigan Corp. No. 1 Edgar A. Tew, SW SW NE section 12-6n-7w, Berlin Township, and Frank Lyons No. 1 Charles Geiger, SW NW NW section 29-8n-8w, Otisco Township.

Another Ionia County wildcat is planned by George Coe, Sr., Ionia bank director, who has taken a number of leases in Berlin Township.

J. V. Wicklund No. 1 Esther Rohrer, SW SW NW section 7-16n-1w, Edenville Township, Midland County, wildcat test has been plugged and abandoned as a dry hole.

Gassers

Aggregate open flow capacity of the Tri Townships field of Mecosta and Montcalm Counties neared 2,000,000,000 feet daily last week with the completion of five more wells with a total gauge of nearly 150,000,000 feet a day, or an average of 30,000,000 feet each.

Largest of the five was Fletcher and Leman No. 1 Milo Dawes, C SE NE section 4-12n-7w, Belvidere Township, Montcalm County, which flowed nearly 40,000,000 feet as one of the larger wells of the state. Pay was encountered in the Michigan Stray sands from 1,276-90 feet.

Gordon Oil Co. No. 1 Edward Higbee, C NE SW section 4, same township, made 35,000,000 feet daily from the Michigan Stray sands as the second largest of the week.

Refiners Petroleum Corp. No. 1 Garner, C SW NW section 33-13n-7w, Millbrook Township, Mecosta County, made 30,000,000 feet at 1,295 feet deep.

Wiser Oil Co. No. 1 A. L. Jayne, C NE SE section 9, Belvidere, blew the tools from the hole when it came in for 23,000,000 feet daily in Michigan pay 25 feet thick to a total depth of 1,298 feet. It is on the south edge of proved territory.

Smallest of the five was Ross and Bernier No. 2 John Bale, C SE NE section 31, Millbrook, which made about 22,000,000 feet daily open flow with 18 feet of pay to 1,338 feet.

Continued heavy new production of gas in the state's largest field, already serving Lansing, Saginaw, Bay City and soon to serve Grand Rapids, as about half a dozen tests were due to drill into the Michigan Stray sands this week.

They include four Belvidere tests as follows: Superior Drilling and Producing Co. No. 1 Elinora L. Smalley, C NW SW section 2; Hyatt-Norton No. 1 Fouts, C SW NW section 3; Frank E. Davis No. 1 Joseph Bloomfield and others, C NE SW section 4, and Hyatt-Norton No. 1 Sutherland, C SE NE section 5.

Three near completions were reported in Millbrook and one in Hinton Township, Mecosta County. They are: Millbrook-Leslie T. Barber No. 1 George D. Flemming, C SW SW section 27; Charles Bell No. 2 Burley Bailey, C SW SE section 30, and Bryan & Martin No. 1 Charles Miller, C NW SE section 34, and Hinton-Columbia Oil and Gas Co. No. 2 R. Freeman, C SE SW section 24-13n-8w.

New Locations

Nineteen permits to drill were issued by the state conservation department for new locations in proved fields in six counties extending over a wide area through central and eastern Michigan. Several offset tests for wells which recently indicated possibilities of new fields though none of the discovery tests were large producers attracted operators' attention. One may extend the Porter pool 1½ miles north and east. Five are for gas tests and the rest for oil, the former in Montcalm and Mecosta Counties and the latter in Bay, Midland, Monroe, Montcalm and Ogemaw Counties.

California Fields

(Continued from Page 130)
is showing a cut of approximately 10 per cent.

Redondo

Drilling operations are showing a consistent increase in the Redondo section of the Torrance field of Los Angeles Basin and a further gain is anticipated during the next few weeks. A number of new wells are nearing completion and the list of new wells during the next 15 days should be somewhat larger than heretofore. The Wilmington district of Los Angeles Basin is also becoming rather active and if the next couple of new wells show satisfactory production we may expect a further increase. Operators have been feeling their way along but will step out in earnest as soon as a good well is completed. The eastern extension of the Montebello field which has failed to come up to the expectations of many did not show any great change during the present week although Wilshire Oil Co. No. 1 Afheldt has been completed flowing 298 bbls. of clean 38.8 gravity oil per day from 6,352 feet after a plug had been put in bottom and the hole redrilled to 5,910 feet. The flow is not as steady as might be desired and the company may therefore reenter the well and make some more hole in order to produce from the lower Nutt zone. In the Playa Del Rey field of Los Angeles Basin, Union Oil Co. completed No. 13 Del Rey, brought in flowing 277 bbls. of clean 22.8 gravity oil per day from 6,078 feet.

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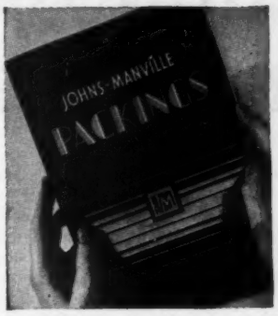

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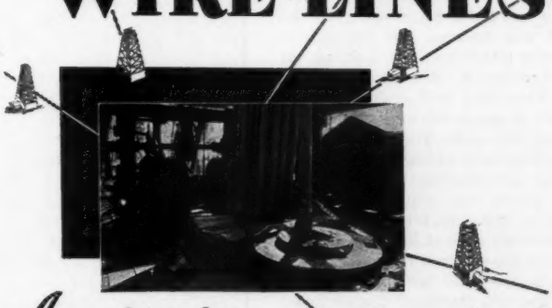

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Southwest Texas District

SAXET HEIGHTS BROADENED; NEW OIL PAY IN SAMFORDYCE

By GEORGE WEBER

SAN ANTONIO, Tex., May 18.—A northwest extension to the Saxet Heights field in Nueces County; discovery of a new producing sand in the Samfordyce field of Hidalgo County, and the showing of gas in two Bee County wildcats stood out as the principal developments of a comparatively quiet week of drilling in Southwest Texas.

The week was further marked by the abandonment of several wildcat tests, some of which had been standing idle. Activity in the Lower Coastal region registered no let-up, and the effect, if any, of the recent Railroad Commission order further reducing allowables in the Loma Novia, Government Wells, Seven Sisters, Lopez, Bruni and O'Hern fields is not yet evident in those areas which comprise most of the Laredo district. Operations of several operators are declining in some of these fields due to drilling up of proven blocks, but proven acreage yet undeveloped will require sustained activity for some time to come.

3,300-Foot Extension

The Corpus Christi or Saxet Heights field on the edge of Corpus Christi received a substantial northwest extension during the week. Hiram Reed No. 1 Katherine Quinn, located on the edge of Nueces Bay and 3,300 feet west of edge production in the field, while not yet completed, was cleaning into the pits at the latest report and was showing for a good producer. Bottom of the hole is at 4,117 feet and casing was set at that depth after a Schlumberger test had been run. The new producer brings the field to the edge of Nueces Bay, and drilling in the shallow water of the bay, while not contemplated by any operators immediately, will probably extend the field in time to tracts leased from the state. Operations in the field may become hampered due to a shortage of water, and plans for sources other than the city system are under way. Completions in this field totaled five during the week. To avoid a possible blowout, J. K. Culton abandoned No. 6 Baldwin when it showed high pressure gas in a shallow sand.

Frio Pay Extended

The deep Frio sand in the Saxet field of the same county was further extended by the completion of Southern Minerals Corp. No. 1 Masten. The well which cored the sand from 5,803-23 feet was cleaning at latest reports and no gauge was available. The Clarkwood townsite area was the scene of new locations. Two producers were brought in from the 4,400-foot sand and one from the 4,800-foot sand of the field.

Four new producers were added to the Plymouth field in San Patricio County, and a fifth was in the completion stage. The Texon Drilling Co. No. 1 Rambo, which blew out and burned while testing the sand of the field, was shut in, and is flowing quantities of oil. It will be completed after tubing and screen are run with proper precautions against another accident. In the Taft field to the south of Plymouth, Shell Petroleum Corp. brought in No. 1 Pullin producing from the deeper sand at 4,915-20 feet. The well gauged 27 bbls. per hour on a one-half inch choke, one of the best producers in the field.

Wildcat Shows Gas

Bee County operations drew attention during the week when two wildcats drilling in that area tested gas. Haworth No. 1 Copeland in the Marshall Survey 3½ miles northwest of the Pettus field tested gas at 375 pounds pressure in 12 minutes at 3,540 feet. The lower Pettus sand showed salt water and the well is being carried to the Yegua. H. A. Pressey's No. 1 Hicks in the Uranga grant, 4½ miles south of Normanna, also tested gas in sand at 3,472-77 feet. Pressure reached 450 pounds in the 15-minute test. The hole was deepened showing 6 feet of saturation, but a second test at 3,560-68 feet showed mud and salt water. Operators are awaiting orders.

Goliad County is seeing a revival in activity, centered in the North Pettus field, where two completions were made during the week, and four rigs are active. Drilling in Bee, Live Oak and McMullen Counties, although comparatively quiet, shows sustained wildcat exploration and development of the small fields.

Duval Very Busy

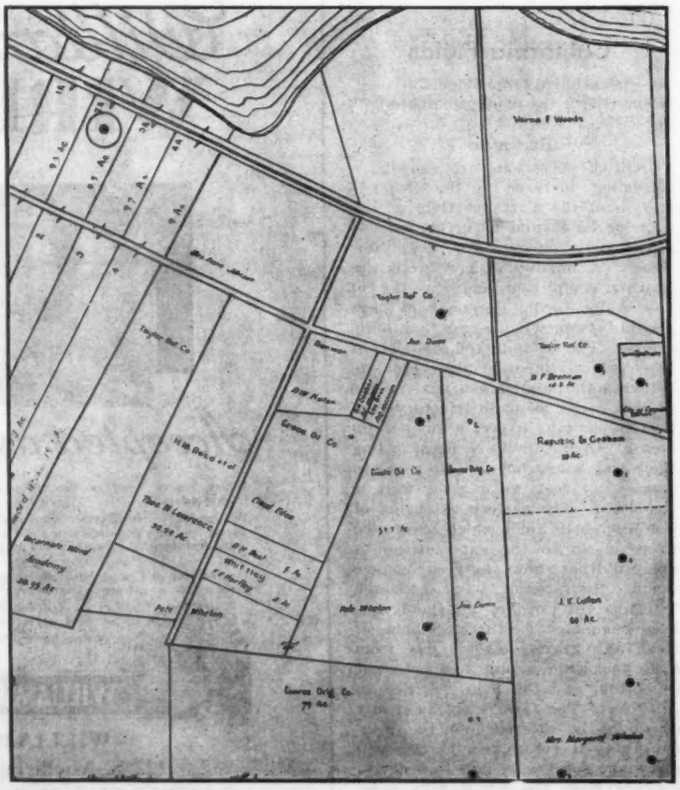
Duval County led in magnitude of completions and drilling operations generally. In the Loma Novia field eight completions were made on leases of Humble Oil & Refining Co., Magnolia Petroleum Co., Texas Co., Valley Osage Oil Co. and Highland Oil Co.

Exceeding Loma Novia in number of completions, the Seven Sisters field chalked up 10. All excepting two of the new producers are set on the Government Wells sands. Those two, located along the east edge of the field are producing from the Chernosky sand. A northwest edge test, Relience Oil & Royalty Co. and Henderson & Harvey No. 1 Drummond tested 1,300 feet of pipe line oil at 2,525-38 feet in 10 minutes and has set casing. The test was made in the second hole after operators lost and abandoned the first at 2,000 feet. The test is located in Survey 308, west of the Humble Oil & Refining Co.'s recent extension producer, No. 2 Wright in Survey 118.

Small field operations in Duval County continue. In the Hoffman field, south of Loma Novia, two wells were brought in. The Labbe, North Kohler, Hagist and Driscoll fields have on active rig each, and Piedra Lumbre and Loma Vista have two and three rigs, respectively. In the latter field, Atlantic Oil Producing Co.'s No. 1 J. F. Welder tested gas at 2,726-51 feet with some mud and is preparing to test again.

Webb County operations are confined to the O'Hern and Lopez fields at the present time. In Lopez, three producers and one gasser were completed.

Zapata County is seeing some increase in activity as two new operators, George Buck and Upchurch & McKay, begin tests in the Haynes field.



Circle indicates location of Hiram Reed's No. 1 Katherine Quinn, which is flowing into pits showing for one of the best producers of the Corpus Christi field. It opens a 3,300-foot northwest extension to the field, and brings production to the edge of Nueces Bay

(Map by Porter Regenold, Corpus Christi, Tex.)

Samfordyce Discovery

The Samfordyce field is due for a completion in a new and deeper sand if completion of the E. A. Graham No. 1 S. Villareal is successful. The test, which is located in Porcion 38, Starr County, cored gas sand at 3,024-32 feet, oil sand at 3,032-42 feet and shale at 3,042-46 feet. The sand shows a saturation of 7 per cent, and operators are reaming for a test early in the week. The No. 1 Villareal is located about 1 mile west of the Barlow No. 1 Marta Flores de Chapa, which had a show at 2,953-55 feet, but has not yet made a producer.

Wildcats abandoned during the week in Southwest Texas numbered 15. These tests were divided among the three districts with two in Duval County, two in Jim Hogg County and one each in Live Oak, McMullen, Starr, Hidalgo and Webb Counties to total nine for the Laredo district. The Lower Coastal district had three failures, two in San Patricio and one in Jim Wells County and three wildcats were abandoned in the Fault Line and Edwards Plateau areas. While several wildcats have had shows for production in Southwest Texas in the past few weeks, only one has opened a new oil field. That field, Bentonville in Jim Wells County, is receiving immediate development, with several new locations announced in the area and three rigs already active.

Rocky Mountain Area

GAP BETWEEN EUNICE FIELD AND MONUMENT NARROWED

By
T. R. INGRAM

DENVER, Colo., May 18.—Colorado reported two wells spudding and no completions.

The W. O. Taylor test at Byron, in Wyoming, swabbed 507 bbls. first 10 hours after acidizing and marks an important completion. Two new operations were reported in Lance Creek, one wildcat in Big Horn County was abandoned and a semi-wildcat is to be drilled in South Baxter Basin.

Four wells were completed in the Cut Bank field in Montana and few new operations got under way. Kevin-Sunburst has 16 active operations under way and one completion and one hole abandoned. Discovery well on the Baker-Glendive anticline is ready to drill into the pay.

NEW MEXICO

The largest completion of the week in New Mexico was the Gulf Oil Corp. No. 1 G. C. Mathews, C SW SE section 6-20-37, in the Monument area in Lea County. It had a natural flow of 2,592 bbls. of oil through tubing in 24 hours. Gas gauged 4,900,000 feet daily. The oil sand was had at 3,774 to 3,884 feet, total depth. Sun Oil Co. No. 5 Weir, C SW NE section 35-19-36, was the only other Monument completion. After acidizing with 4,000 gallons, it flowed 744 bbls. in 24 hours. The oil pay was topped at 3,821 feet; total depth, 3,940 feet.

In the Eunice area, Continental Oil Co. No. 6-A-17 Meyer, C NW SW section 17-21-36, was completed at 3,955 feet, total depth, in pay topped at 3,840 feet. It flowed 1,080 bbls. natural between casing and drill pipe in 24 hours. Gas gauged 497,000 feet. Shell Petroleum Corp. No. 1 State "H," C SE SE section 13-21-35, flowed 240 bbls. through tubing the first 24 hours after a shot and was completed. Gas measured 3,000,000 feet. It had oil pay at 3,906-27 feet. Total depth was 3,954 feet, but water intruded and it was plugged back to 3,927 feet. Empire Oil & Refining Co. No. 2 Felton, C SE NW section 28-21-36, failed to make a commercial producer after shooting with 460 quarts and acidizing with 10,000 gallons and was dry and abandoned at 3,990 feet, total depth.

Shell Petroleum Corp. and Devonian Oil Co. No. 1 Christmas, C NE NE section 21-22-36, in the McDonald area, was completed at 3,884 feet, total depth, in pay topped at 3,750 feet. It was acidized with 2,000 gallons and shot with 350 quarts, pumping 120 bbls. of oil in 24 hours.

Harry Leonard No. 1 Justus, SW NW NW section 20-25-37, in the Jal sand area, produced 17 bbls. of oil and 2,500,000 feet of gas in the first 24 hours after a shot and was completed. Oil pay was topped at 2,935 feet; the well was drilled to 3,501 feet, total depth, and plugged back to 2,970 feet. W. L. Todd and others No. 1 Lemon Permit, C NW SW section 17-21-32, a wildcat, was dry and abandoned at 3,752 feet, total depth.

The gap between the Monument and Eunice pools apparently is being narrowed by two wells that are showing as producers. Repollo Oil Co. No. 1 William C. Roach, NE cor. section 21-20-37, 3 miles north of the Eunice pool and 2½ miles southeast of Monument production, flowed 115 bbls. in 15 hours after acidizing and was reported flowing steadily through tubing set at 3,786 feet; total depth, 3,830 feet. The other prospective completion was the Gulf Oil Corp. No. 1 A. B. Reeves, C NW SW section 29-20-37, 2 miles southwest of No. 1 Roach and 1½ miles north of the Eunice pool. It was acidized with 1,000 gallons and swabbed 8 bbls. an hour; it was treated with acid a second time but had not been tested. Total depth was 3,844 feet in lime pay.

Another wildcat test, the Repollo Oil Co. No. 1 Boyd, SW NW section 23-22-37, 1 mile east of the Carey pool, was showing for production in lime pay topped at 3,642 feet; total depth, 3,700 feet. On swabbing test it produced 40 bbls. in 24 hours. It was being tubed preparatory to acidizing.

Cooper Area

Plains Prod. Co. No. 1 R. L. Mosley, C NW SE sec. 34-24-37. T.D. 3,551 ft.; show sulfur wtr.; P.B. 3,530 ft.; gauged 2,360,000 ft. gas; set 7-in. csg.
Southern Oil Corp. No. 1 Vaughan, C SW SE sec. 15-24-36. Moving in rotary.
Southern Oil Corp. No. 1 Gates, C SW NW sec. 23-24-36. T.D. 2,135 ft.; S.D. for repairs.
Skelly Oil Co. No. 5 Coates, C NE SE sec. 3-24-36. Rig.

Sims Area

Samedan Oil Co. No. 1 Parks, 330 ft. from S and 400 ft. from W lines, SW¼ sec. 14-22-37. Drlg. 3,520 ft.
Continental Oil Co. No. 1-A-22 Elliott, C SW SW sec. 22-22-27. T.D. 3,323 ft.; set 6⅝-in. csg.
Skelly Oil Co. No. 1 Ella Simms, C NW NE sec. 3-23-27. Rig.
Penrose & Rowan No. 2 Cary, C NE SW sec. 22-22-37. Drlg. 3,475 ft.
Sun Oil Co. No. 1 Richards, C NE SE sec. 6-23-37. Drlg. 3,798 ft.
Humble Oil & Refining Co. No. 1 W. B. Farrell, C SW SE sec. 22-22-37. Drlg. 1,165 ft.
Tide Water Oil Co. No. 1 A. Walden, C SE NE sec. 21-22-37. Drlg. 1,040 ft.
Magnolia Pet. Co. No. 1 Cary, C NE SE sec. 21-22-37. T.D. 1,350 ft.; set 8⅝-in. csg.
Penrose & Rowan No. 3 Cary, C SE NW sec. 22-22-37. T.D. 1,150 ft.; set 8⅝-in. casing.
Continental Oil Co. No. 1-A-15 Elliott, SE SE SE sec. 15-22-37. Location.
Continental Oil Co. No. 1-A-21 Elliott, C SE SE sec. 21-22-37. Location.
Skelly Oil Co. No. 2 J. V. Baker, C NW NW sec. 27-22-37. Rig.
Gulf Oil Corp. No. 1 F. C. King, C SW NW sec. 5-23-37. Location.
Penrose & Rowan No. 4 Cary, C SW NW sec. 22-22-37. T.D. 1,146 ft.; set 8⅝-in. casing.

Chaves County

Tannehill No. 2 Campbell, C NE SE sec. 1-11-25. T.D. 1,400 ft.; straightreaming; to set 5-in. csg.
Comanche Drlg. Co. No. 2 Sloop & Purcell, C NE NE sec. 15-11-26. Drlg. 680 ft.

Hobbs Area

Shell Pet. Corp. No. 1 State "E," C E half SE SE sec. 14-18-37. T.D. 4,374 ft.; P.B. 4,178 ft.; shut down for orders.
Continental Oil Co. No. 3-B-13 State, C NE SW sec. 13-18-37. Drlg. 4,245 ft.
National Securities Oil Corp. No. 1 Linam, NE SE SW sec. 33-18-37; wildcat. Old well plugging back from 4,238 to 4,228 ft.; swabbed sulfur water; no oil; shut down for orders.
Shell Petroleum Corp. No. 4 Sanger, SW SW NW sec. 27-18-39. T.D. 1,705 ft.; set 9⅝-in. casing.

Monument Area

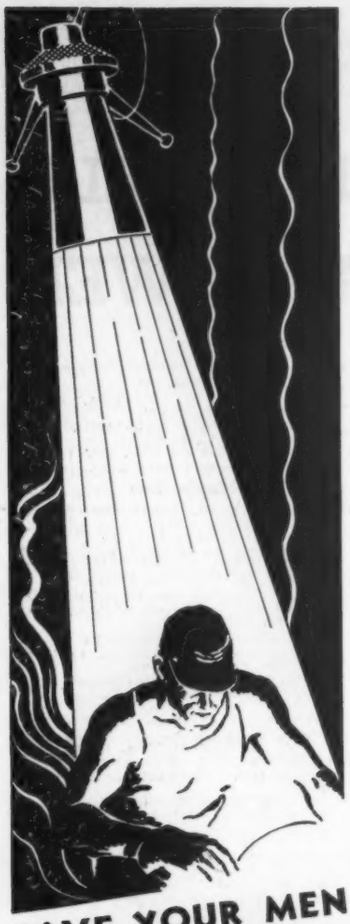
Continental Oil Co. No. 2-C-30 State, C NW NW sec. 30-19-37. T.D. 3,975 ft.; tbg. to test.
Anderson & Prichard Oil Corp. No. 1 Britt "A," C SE SW sec. 6-20-37. T.D. 3,906 ft.; flowed 18 B.P.H. through D.P.; tstg.
Gulf Oil Corp. No. 1 A. B. Reeves, C NW SW sec. 29-20-37. Wildcat; T.D. 3,844 ft. in L.; acidized; swbd. 8 B.P.H.
Gulf Oil Corp. No. 3 Graham-State "C," C SW NE sec. 24-29-36. Drlg. 4,030 ft.
Sun Oil Co. No. 6 Weir, C NW NE sec. 35-19-36. Loc.
Texas Co. No. 2 Mattern, C SW SW sec. 20-19-37. T.D. 3,942 ft.; tbg.
Amerada Pet. Corp. No. 1 State "P," C NW SW sec. 29-19-37. Drlg. 3,820 ft.
Amerada Pet. Corp. No. 1 State "R," C NE SW sec. 29-19-37. Drlg. 3,045 ft.
Amerada Pet. Corp. No. 2 State "O," C SW NE sec. 30-19-37. T.D. 3,850 ft.; set 6⅝-in. csg.
Texas Co. No. 2 Phillips, NE NE NW sec. 6-20-37. T.D. 3,890 ft.; flowed 248 bbls. in 1½ hrs.; 14,000,000 ft. gas.
Amerada Pet. Corp. No. 1 Weir "B," C SW NE sec. 26-19-36. T.D. 4,030 ft.; gas est. 1,500,000 ft.; tstg. wtr.; may P.B.
Amerada Pet. Corp. No. 2 State "H," C NW SE sec. 1-20-36. Drlg. 3,845 ft.
Skelly Oil Co. No. 2 State "D," C NE SE sec. 1-20-36. T.D. 3,800 ft.; set 7-in. csg.
Texas Co. No. 4 State "E," C NE SW sec. 1-20-36. T.D. 2,540 ft.; set 7-in. csg.
Tide Water Oil Co. No. 1 State "F," C NW NW sec. 20-19-37. Drlg. 3,973 ft.
Ohio Oil Co. No. 2 State-Elliott, C NE SE sec. 30-19-37. T.D. 3,800 ft.; set 7-in. csg.
Continental Oil Co. No. 2-A-6 Britt, C NW SW sec. 6-20-37. Drlg. 3,705 ft.
Fred Turner, Jr., No. 1 State "A," NE NW SW sec. 2-20-36. Drlg. 3,264 ft.
Texas Co. No. 3 Phillips, C SW NW sec. 6-20-37. Drlg. 3,492 ft.
Anderson-Prichard Oil Corp. No. 3 Britt, SE SW NE sec. 7-20-37. Cellar and pits.
Sun Oil Co. No. 1 State, C NE NE sec. 25-19-36. Drlg. 1,890 ft.
Anderson-Prichard Oil Corp. No. 1 State, C SW NW sec. 2-20-36. R.U.R.
Gulf Oil Corp. No. 2 Luthy, C NW NW sec. 29-19-37. Drlg. 3,300 ft.
Amerada Pet. Corp. No. 3 State "O," C SE NE sec. 30-19-37. Drlg. 3,240 ft.
Continental Oil Co. No. 4 State "C," C SW NW sec. 30-19-37. Cellar and pits.
Continental Oil Co. No. 3 State "C," C SE NW sec. 30-19-37. Drlg. 3,575 ft.
Amerada Pet. Corp. No. 1 Lambert, NW NW NE sec. 6-20-37. Drlg. 3,042 ft.
Amerada Pet. Corp. No. 1 State "S," C SE SW sec. 2-20-36. Drgl. 2,865 ft.
Gulf Oil Corp. No. 1 S. T. Burk, C NE NE sec. 28-19-37. Drlg. 3,280 ft.
Amerada Pet. Corp. No. 4 State "O," C NE NE sec. 30-19-37. T.D. 2,512 ft.; set 8⅝-in. csg.
Texas Co. No. 1 State "J," C NE SW sec. 24-19-36. T.D. 1,355 ft.; set 9⅝-in. csg.
Amerada Pet. Corp. No. 1 State "T," C SE SW sec. 25-19-36. Cellar and pits.
Shell Pet. Corp. No. 1 J. A. Foster, C SE SE sec. 34-19-36. Drlg. 1,335 ft.
Amerada Pet. Corp. No. 3 Phillips, C SW NE sec. 1-20-36. Rig.
Amerada Pet. Corp. No. 3 State "D," C SE NW sec. 1-20-36. Rig.
Gulf Oil Corp. No. 4 Graham-State "C," C SW SE sec. 24-19-36. Drlg. 1,345 ft.
Gulf Oil Corp. No. 1 J. W. Smith, C SE NE sec. 24-19-33. Drlg. 1,590 ft.
Barnsdall Oil Co. No. 5 Cooper, C NE SE sec. 12-20-36. Drlg. 1,730 ft.
Gulf Oil Corp. No. 7 Culp, C NE NE sec. 19-19-37. R.U.R.
Gulf Oil Corp. No. 1 D. A. Williams, C NW SE sec. 29-19-37. R.U.R.
Empire O. & R. Co. No. 2 State "E," SE SE SW sec. 30-19-37. Drlg. 1,538 ft.
Ohio Oil Co. No. 3 State-Elliott, SW SW SE sec. 30-19-37. R.U.R.
Anderson-Prichard Oil Corp. No. 2 Britt "A," C NE SW sec. 6-20-37. Loc.
Amerada Pet. Corp. No. 2 Phillips, C SE NE sec. 1-20-36. Drlg. 3,805 ft.
Skelly Oil Co. No. 1 State "E," C SE NE sec. 29-19-37. Bldg. rig.
Empire O. & R. Co. No. 3 State "E," C NW SW sec. 30-19-37. Drlg. 267 ft.
Continental Oil Co. No. 2-A-3 Reed, C SE NE sec. 3-20-36. Bldg. rig.
Texas Co. No. 1 State "K," C SE SE sec. 18-19-37. Cellar and pits.
Oilwell Drlg. Co. No. 2 State "A," C NW NE sec. 29-19-37. M.I.M.
Ohio Oil Co. No. 4 State-Elliott, C SE SE sec. 30-19-37. Cellar.
Anderson-Prichard Oil Corp. No. 4 Britt, NE NW NE sec. 7-20-37. Bldg. rig.

Eunice Area

Gulf Oil Corp. No. 8 Bell-Ramsey-State, C NW NW sec. 4-21-36. T.D. 3,870 ft.; set whipstock at 3,714-35 ft.
Gulf Oil Corp. No. 66 Arnott-Ramsey "C," C NE NW sec. 21-21-36. Drlg. 3,183 ft.
Empire G. & F. Co. No. 4 State "D," C SE NE sec. 32-21-36, five-eighths mile N part of No. 157 lease. T.D. 3,941 ft.; acidized, waiting.
Gulf Oil Corp. No. 2 Janda "B," C NE SE sec. 32-21-36. T.D. 3,880 ft. in lime; swabbing through tubing.
Gulf Oil Corp. No. 1 Arnott-Ramsey "D," C NW NW sec. 22-21-36. T.D. 3,885 ft. Acidizing, no help; reacidized, no help; tested 28 bbls. in 24 hrs. on gas lift.
Continental Oil Co. No. 5-A-18 Meyer, C SE NE sec. 18-21-36. Drlg. 3,780 ft.
Jim Murray No. 2 Wallace, C NW NW sec. 3-21-36. T.D. 3,846 ft.; tubing to test.
Continental Oil Co. No. 1-B-14 Lockhart, C SW NW sec. 14-21-36. Drlg. 2,974 ft.
General Crude Oil Co. No. 2 State "E," C NE SW sec. 32-21-36. T.D. 1,652 ft.; set 9⅝-in. casing.
Shell Pet. Corp. No. 1 State "E," C NE NE sec. 6-21-36. Drlg. 3,363 ft.
Gulf Oil Corp. No. 1 Janda "C," C NW SW sec. 15-21-36. Drlg. 3,892 ft.
Tide Water Oil Co. No. 2 State "E," C SE SE sec. 15-21-36. T.D. 3,766 ft.; fishing.
Devonian Oil Co. No. 4 State-Heasley, C SW SW sec. 5-21-36. Drlg. 3,457 ft.
Atlantic Oil Producing Co. No. 1 State "K," C SE SW sec. 6-21-36. Drlg. 2,975 ft.
Humble Oil & Ref. Co. No. 4 Adkins, C NW SW sec. 10-21-36. Drlg. 3,867 ft.
Shell Pet. Corp. No. 1 State "J," C SE SW sec. 32-20-37. Drlg. 2,475 ft.
Gulf Oil Corp. No. 9 Bell-Ramsey, C SW SW sec. 4-21-36. T.D. 1,272 ft.; set 7⅝-in. casing.
Gulf Oil Corp. No. 4 Orcutt, C SE NE sec. 6-21-36. T.D. 1,205 ft.; set 7⅝-in. casing.
Gulf Oil Corp. No. 1 Frona Leck, C NW NE sec. 14-21-36. Drlg. 3,575 ft.
Gulf Oil Corp. No. 7 Arnott-Ramsey "C," C NW NE sec. 21-21-36. Rigging up rotary.
Continental Oil Co. No. 6-A-18 Meyer, C NW NE sec. 18-21-36. R.U.R.
Continental Oil Co. No. 9-B-4 Meyer, C NE NW sec. 4-21-36. Drlg. 2,790 ft.
Continental Oil Co. No. 10-B-4 Meyer, C NE NE sec. 4-21-36. Drlg. 2,178 ft.
Continental Oil Co. No. 11-B-4 Meyer, C SE SE sec. 4-21-36. Location.
Humble Oil & Ref. Co. No. 5 Adkins, C SE SW sec. 10-21-36. Drlg. 1,441 ft.
Samedan Oil Co. No. 1 Marshall, C SW NW sec. 12-21-36. Drlg. 250 ft.
Continental Oil Co. No. 8-A-18 Lockhart, SE SE SW sec. 18-21-36. Moving in material.
Continental Oil Co. No. 2-B-18 Meyer, C NE NW sec. 18-21-36. Drlg. 3,043 ft.
Tide Water Oil Co. No. 1 State "G," C SE NE sec. 21-21-36. Drlg. 1,035 ft.
Continental Oil Co. No. 6-B-28 Lockhart, C NE SW sec. 28-21-36. Location.
Landreth Production Co. and Ohio Fuel Supply Co. No. 1 State "E," C SW NW sec. 22-21-36. Drlg. 1,274 ft.
Continental Oil Co. No. 4-A-18 Meyer, C SW NE sec. 18-21-36. Drlg. 3,931 ft.; flowed 56 bbls. in 1 hr.
Texas Co. No. 2 State Aggies, C SW SE sec. 31-20-37. Rigging up rotary.
Humble Oil & Ref. Co. No. 1 State "D," C SE SW sec. 31-20-37. Cellar, pits.
Continental Oil Co. No. 12-B-4 Meyer, C SE SW sec. 4-21-36. Cellar and pits.
Devonian Oil Co. No. 5 State-Heasley, C NW SW sec. 5-21-36. Location.
Devonian Oil Co. No. 6 State-Heasley, C NE SW sec. 5-21-36. Location.

Lea County—Miscellaneous

Culbertson-Irwin & Stovall No. 1 J. B. Humphreys, C SE SW sec. 2-25-37. T.D. 3,702 ft.; 400 ft. oil in hole.
Plains Prod. Co. No. 1 George Smith, C SE SE sec. 4-25-37. T.D. 3,605 ft.; tstg.
Texas Co. and Repollo Oil Co. No. 1 Lanehart, C NE sec. 29-25-37. T.D. 3,770 ft.; W.O.C.
Maljamar O. & G. Co. No. 6 Baisch, C NW SE sec. 21-17-32. T.D. 4,139 ft.; P.B. 3,960 ft.; to acidize.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Sun Oil Co. No. 1 Weatherly, C NE SW sec. 17-21-37. Wildcat; drlg. 3,815 ft.; swbd. 1 B.P.H. through tbg.

Ohio Oil Co. No. 1 W. H. Turner, C NE SE sec. 29-31-37. Drlg. 3,125 ft.

Landreth Prod. Co. No. 1 J. W. Grizzell, C SE SW sec. 5-22-37. Drlg. 1,257 ft.

Rowan et al No. 1 Mattern, C SW SE sec. 7-22-37. Drlg. 1,900 ft.

C. & G. Oil Co. No. 1 E. Weir, C NE NE sec. 14-20-37. Wildcat; drlg. 3,085 ft.

Gulf Oil Corp. No. 1 E. King, C SW NW sec. 28-21-37. Drlg. 2,540 ft.

Gulf Oil Corp. No. 1 W. T. McCommack, C NE NE sec. 32-21-37. Drlg. 1,650 ft.

Continental Oil Co. No. 1 J. C. Farney, C SW SE sec. 5-23-36. Wildcat. Loc.

Gulf Oil Corp. No. 1 S. J. Carr, C NW SW sec. 3-24-37. Drlg. 470 ft.

Gulf Oil Corp. No. 2 N. F. Humphreys, C NE NW sec. 25-25-36. T.D. 1,305 ft.; set 9⅝-in. csg.

Sun Oil Co. No. 1 Stuart, C NW NE sec. 15-25-37. T.D. 3,283 ft.; swbg. 40 B.P.D.

Continental Oil Co. No. 2-A-19 Eaves, C SW SW sec. 19-26-37. Bldg. rig.

Gulf Oil Corp. No. 1 J. A. Stuart, C SW NE sec. 10-25-37. T.D. 305 ft.; set 12½-in. csg.

Gulf Oil Corp. No. 1 L. M. Buffington, C NW SW sec. 13-25-37. Drlg. 992 ft.

Sun Oil Co. No. 1 Lanehart, C SE SE sec. 20-25-37. Drlg. 681 ft.

Humble O. & R. Co. No. 1 Lanehart, C NE SW sec. 21-25-37. Drlg. 1,420 ft.

Humble O. & R. Co. No. 1 Hadfield, C NW SE sec. 21-25-37. Drlg. 1,940 ft.

Magnolia Pet. Co. No. 1 E. O. Carson, C NW SW sec. 28-21-37. Spudded.

Skelly Oil Co. No. 1 Stuart, C NE NW sec. 15-25-37. Cellar and pits.

Texas Co. No. 1 Eula Alexander, C NW SW sec. 7-21-37. R.U.R.

Byrd-Frost, Inc., No. 1-A-1 Wells, C NW SW sec. 1-25-36. Cellar, pits.

Grayburg Oil Co. No. 7 Burch, C NW NE sec. 19-17-30. Loc.

Eddy County

Etz Bros. No. 2 State, C NW SW NE sec. 16-17-30. Drlg. 2,705 ft.; heads 10 to 15 B.P.D.

Ohio Oil Co. No. 1 State-McCullough, SE SW SW sec. 16-17-30. T.D. 3,149 ft.; flowed 305 bbls. in 14 hrs.; to acidize.

Premier Pet. Corp. No. 2 Dexter "E," NW SW NE sec. 20-17-30. T.D. 3,275 ft.; to acidize.

Red Lake Oil Co. No. 6 State, NE NE SW sec. 22-17-28. T.D. 1,954 ft.; 800 ft. oil in hole; shot at 1,925-37 ft.; C.O.; est. 50 B.P.D.

D. & B. Oil Co. No. 1 Jenkins, NW SW NW sec. 20-17-30. T.D. 3,258 ft.; tstg.; est. 200 B.P.D.

Dexter & Berry No. 1 Berry, NW NE NW sec. 21-17-30. Drlg. 2,807 ft.

Dooley & Dixon No. 1 Commerce, C W½ NW NW sec. 18-20-27. Drlg. 936 ft.

NORTHWEST NEW MEXICO

Bernalillo County

Norine Realty Co., Inc. No. 2 Gallegas grant, SE NW NW sec. 19-11n-4e. Drlg. 1,500 ft. sd. and gravel.

Guadalupe County

Anton Chico Dev. Co. No. 2 fee, NW NE SW sec. 20-9n-17e. Drlg. 785 ft. in sand.

Harding County

Khaay et al No. 1 De Baca, C sec. 19-20-31e. Rng. 8¼-in. at 847 ft.; 10-in. at 250 ft.

San Juan County

Kutz Canon O. & G. Co. No. 1 Day, SW SW SW sec. 20-28-10w. S.D. 4,400 ft.

Nick Spatter No. 1 fee, C NE SW sec. 32-21-11w. S.D. 1,780 ft.; T.A.

Southern Union Gas Co. No. 6 Government, C NW NW sec. 19-28-10w. Running 8¼-in. at 1,215 ft.

Torrance County

45 Pet. Co. No. 1 Greenfield, C NW SW sec. 17-9-8e. Drlg. 1,760 ft. wh. L.

Bruce Frazier No. 1 Frazier, SE sec. 12-2n-31e. Drlg. 1,575 ft. sd. and L.

COLORADO

Adams County

Glenridge Oil Corp. No. 1 Hills, SE SE NE sec. 27-3s-64. Deepened to 4,212 ft.; cmtd. to bottom; drlg. plug.; good show oil at 4,210 ft. in shale.

Riddle Pet. Co. No. 1 Baxter, C SW sec. 2-3s-6w. S.D. 700 ft. for D.P.

Archuleta County

Wm. E. Hughes Estate No. 6 Gramps, NW NE SE sec. 24-33n-2e (unsurveyed) Drlg. 732 ft.

Wm. E. Hughes Estate No. 7 Gramps, NW SE SE sec. 23-33n-2e (unsurveyed). M.I.M.

Carl D. Lindstrom No. 1 Crowley, SE SE SE sec. 3-32n-2e. M.I.M.

Oil City Pet. Co. No. 1-A Garnett, NW NE NW sec 25-33n-2e. S.D. 1,515 ft.; top Dakota series 1,415 ft.

Oil City Pet. Co. and Archuleta O. & G. Co. No. 1 Reeder, Lot 5 (SW SE SW) sec. 24-33n-2e. Through the gravel and into shale at 355 ft., where 10-in. was set.

H. L. Kendrick No. 1 Crowley (unsurveyed), sec. 2-32-1. S.D. 1,125 ft. for 6¼-in.

Montezuma County

McElmo Oil Co. No. 1 West, NE NW NE sec. 21-36n-17w. Contracted with Perry Coon to comp.; T.D. 3,705 ft.; drove tools to bottom; fshg.

Jefferson County

Ruby Hill O. & G. Co. No. 1 Braden, SE SE SE sec. 24-4s-69w. Drlg. 4,435 ft.

La Plata County

McGarr Pet. Co. No. 1 Pinton Mesa, CSL NE NE sec. 34-35n-12w. Drlg. 3,200 ft.

Baca County

Paul R. Robb Pet. Corp. No. 1 Lovett, NW NW NW sec. 24-32s-48w. Cmtd. 12½-in. at 390 ft.

Las Animas County

Mountain States Oil Corp. No. 1 Nikola, C NE SE sec. 10-34n-62w. S.D. 1,813 ft.

Lincoln County

Consolidated Smelting & Metals Co. No. 1 Hancock, NE NE sec. 7-17s-52. S.D. 2,001 ft.

Morgan County

Swisher et al No. 1 Lunt, 92 ft. W of E line and 360 ft. N of S line, sec. 3-4n-60. S.D. 1,449 ft.

Park County

The South Park Oil Co. No. 1 State, in the Hartsel district, after swabbing at the rate of 200 bbls. of oil a day, was deepened to 4,167 feet where it is bottomed in a basalt sill. A magnetometer survey may be made to determine the approximate thickness of the sill before drilling deeper. Several of these stringer intrusions were drilled higher up in the hole and proved to be only a few feet thick and beneath them puffs of gas were invariably encountered. The same company's No. 1 Le Bert, 660 feet south of the discovery well, is spudding.

South Park Oil Co. No. 1 Le Bert, NE NE NW sec. 21-11s-75w. Spdg.

South Park Oil Co. No. 1 State, SE NE SW sec. 16-11s-75w. Stdg. at 4,167 ft.

Routt County

Mid-Colo. Pet. Co. No. 1 Omoholt, NE SE SE sec. 29-4n-87w. Set 8¼-in. on bottom at 1,910 ft. and S.D. acct. bad roads.

Washington County

Indian Territory Ill. Oil Co. and Foster Minerals Corp. No. 1 Vance, C NE NE sec. 28-1s-49w. M.O.G. wtg. on rig biders.

Weld County

Continental Oil Co. No. 1 State Bank of Trenton, C SW NE sec. 21-8n-59w. Set 16-in. at 421 ft. with 300 sacks; W.O.C.

Yuma County

Indian Territory Ill. Oil Co. No. 1 Strangways, C NW SW sec. 21-2s-43w. Bldg. rig.

WYOMING

Albany County

California Co. No. 2 Hoist, 1,650 ft. W of E line and 970 ft. N of S line, sec. 18-17n-77w. T.D. 3,420 ft.; circulating.

California Co. No. 1 Wilson, NW SW SW sec. 18-17n-76w. Drlg. 2,293 ft.

James Lake Oil Co. No. 1 George & Hunt, NW NE SE sec. 5-17-75w. Spdg.

Big Horn County

W. O. Taylor and others No. 1 Hoskins, Lot 5 (SE SE) section 25-56-97, which extends production on the Byron dome 1½ miles to the south, was drilled a little deeper from former total depth of 5,366 feet, acidized and completed. It swabbed 507 bbls. first 10 hours and a later report said it was making 15 bbls. an hour. The top of the Tensleep was at 5,355 feet and the top of the Embar was at 5,252 feet. The well is on an island in the Shoshone River and on a block of 720 acres held under a government permit. S. H. Keoughan, former president of the Continental Oil Co., took the contract to complete the well with rotary early in 1934, and it is reported that he will receive a half-interest in it. Between the fault block in which the well is located and the center of the field is another untested fault block. Oil was encountered at approximately 1,400 feet below sea level as compared with sea level in the Kinney-Coastal Oil Co. No. 3 Government in section 24-56-98, on the Garland dome, 6 miles to the west. The Embar carries considerable gas on the Garland dome and acidization may make that horizon a large oil producer. The relative position of the two wells leads to the belief that the Embar may be productive in the syncline between the two domes and that Garland may be filled with oil to its utmost closure of 3,000 feet.

The new discovery on the Little Beaver Creek dome in eastern Montana lies about midway between the big black oil reserves in the Big Horn basin and the Twin Cities-Great Lakes region and the possibility of tying up the two sources of supply in the development of an eastern market is receiving considerable attention. The subject of a pipe line out of the Big Horn Basin to give a market to the black oil has been frequently discussed and the increasing use of oil for road building and the bringing in of a new supply in eastern Montana undoubtedly will give impetus to the movement and possibly point to a more feasible solution of the problem.

J. H. Shaffer's test on the Manderson dome in its No. 1 Keachie, C SW SW section 7-49-91, has been plugged and abandoned at 1,350 feet.

J. W. Bales No. 1 Parker, C SW SW sec. 23-4-89. S.D. 690 ft. for pipe.

Joan Oil Co. No. 1 Howell, Lot 63 (NW SE NE) sec. 32-55n-97w. Resuming at 1,190 ft.

Peter Evanhoff et al No. 1 McAlister, Lot 4, NW NE SE sec. 35n-87w. T.D. 2,350 ft.; C.O.

Montana-Wyoming Oil Co. No. 1-X Allen, Lot 52, sec. 18-56n-97w. Spdg. 276 ft. (relief well for No. 1 Allen).

Ohio Oil Co. No. 1 Orson Vail, SW NW NE sec. 23-56n-97w. Rig.

Ohio Oil Co. No. 1 Robert Till, C SE SW sec. 24-56n-87w. Drlg. 3,433 ft.

Ohio Oil Co. No. 4 Byron-Union, SW NE sec. 22-56n-97w. Sidetrkd. tubing; redrld. to 5,714 ft.; P.B. to 5,700 ft.; W.O.C.

Peay Oil Co. No. 1 Denio, Tr. 43-C, sec. 15-55n-97w. Drlg 3,335 ft.

Stock Oil Co. No. 1 Yates, CSL SW NE sec. 33-56n-97w . Drlg. 1,543 ft. in shale.

Carbon County

General Pet. Corp. No. 1 Union Pacific, SW NW sec. 5-19n-83w. Cmtd. 12¾-in. at 492 ft., 400 sacks; drlg. 1,310 ft.

Ohio Oil Co. and California Co. No. 2 Union Pacific, C NE NE sec. 35-21n-79w. Drlg. 3,905 ft.

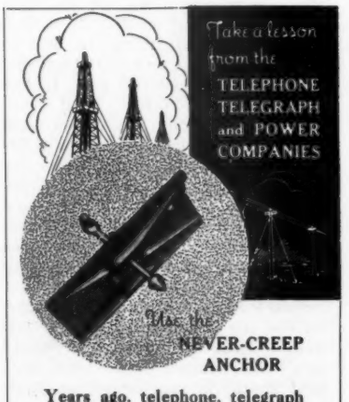
Ohio Oil Co. No. 9 H. & C., SW SW SW sec. 35-20n-78w. T.D. 3,800 ft.; P.B. to 3,175 ft.; cmtd. 5¾-in. liner at 2,833-3,045 ft.; recompltg. in Lakota.

Ohio Oil Co. No. 7 Diamond Cattle, N½ sec. 35-20n-78w. Rig; W.O. tools.

Ohio Oil Co. and California Co. No. 3 Union Pacific, C NE SE sec. 23-21n-79w. Drlg. 2,852 ft.

Ohio Oil Co. No. 1 Dixon, NE NE SE sec. 34-20n-78w. T.D. 3,314 ft.; swabbing and testing.

Ohio Oil Co. No. 2 Dixon, SE NE SE



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sec. 34-20n-78w. R.U. to deepen old well from 3,094 ft. to Sundance.

Union Oil Co. of California and Mutual Oil Synd. No. 1 Union Pacific, 1,890 ft. from E line and 1,320 ft. from S line, sec. 1-18-78w. Resumed drlg. at 4,400 ft.

Converse County

Chadron-Osage Oil Co. No. 1 State, SW SW SW sec. 16-32n-69w. Drlg. 2,150 ft.; cmtd. 12½-in. at 1,500 ft.; carrying 10-in. at 2,150 ft.

J. A. Olson No. 1 Reese, C NE SE sec. 10-32n-65w. M.I.M.

Fremont County

Tropic Oil Co. No. 1 Government, C SE SW sec. 34-27n-90w. T.D. 2,550 ft.; running 4½-in.

Sinclair-Wyoming Oil Co. No. 1 Keisch, NE SW sec. 1-33n-92w. M.I. rot.

Hot Springs County

California Exploration Co. No. 2 Government, NW SW NW sec. 4-44-96. T.D. 4,245 ft.; P.B. to 4,165 ft.; shot 80 qts.; swdg. cg.

Ohio Oil Co. No. 73 Mill Iron Cattle Co., NE SW SE sec. 19-4n-98w. Drlg. 1,855 ft.

Stanolind O. & G. Co. No. 20 State-Ridgely, SE NE SE sec. 19-46n-98w. T.D. 3,931 ft.; top of Embar 3,908 ft.; 6⅝-in. cmtd. 3,913 ft.; R.U.S.T.

Lincoln County

Senrab Oil Corp. No. 3 Government, CSI, SE NW sec. 10-26n-113w. S.D. 1,020 ft

Niobrara County

The MacKinnie Oil & Drilling Co., which recently acquired the Thompson lease of 320 acres in the E half of the W half and W half of the E half section 7-35-65, Lance Creek field, will drill in the NE cor. NW NE of the section. The J. M. Huber Corp. will drill the well for an interest. It is close to a well drilled by the Texas Co. a number of years ago which was a gas producer for some time in the Dakota. It is an outpost well in the Sundance development and on approximately the same contour as the Ohio Oil Co. No. 4 Putnam, a producer in the Sundance on the eastern edge of the field.

The Ohio Oil Co. No. 3 Rohlff, C SE NE section 32-36-65, the most northerly Sundance well, which went dead after flowing 100 bbls. an hour, is now flowing 75 bbls. a day of pipe line oil and is running tubing to complete.

Argo Oil Co. No. 7 Elliott, C NE NW sec. 5-35n-65w. T.D. 4,009 ft., red beds; swabbing and testing.

Black Hills Ref. Co. No. 1 Mills Est., C SW NW sec. 27-36n-64w. Spudded and S.D. account of weather.

Continental Oil Co. No. 6 Rohlff, C SW SW sec. 32-36n-65w. T.D. 3,453 ft.; rec. slightly sat. core at 3,439-43 ft.

Continental Oil Co. No. 4 Joss, 90 ft. W of C SW NE sec. 6-35n-65w. Drlg. 2,565 ft., hd. sdy. sh.

Continental Oil Co. No. 2 Apex-3, C SE NW sec. 34-36n-65w. R.U.

Lewis (Gokel No. 1, SW NE sec. 31-35n-62w. Cmtd. 10-in. at 300 ft.; W.O.C.

J. H. Huber Co. No. 1 Joss, NE SE NW sec. 6-25n-65w. T.D. 4,096 ft.; P.B. to 4,032 ft.; pumping 194 bbls. oil and same quantity of water; w.o. casing tester.

MacKinnie Oil & Drlg. Co. No. 1 Thompson, NE NW NE sec. 7-35n-65w. M.I.M. (first report).

Ohio Oil Co. No. 3 Agnes Rohlff, C SE NE sec. 32-36n-65w. T.D. 3,958 ft. in top red beds; testing.

Ohio Oil Co. No. 8 Lamb, C SW NE sec. 5-35n-65w. R.U. (first report).

Ohio Oil Co. No. 5 Converse Sheep, C SE SW sec. 32-36n-65w. Drlg. 3,950 ft.

Sheridan County

Beaver Creek Oil Co. No. 1 Allison, SW SE sec. 15-55n-85w. Drlg. 3,668 ft.

Sweetwater County

The Mountain Fuel Supply Co. has made a location for its No. 1 W. T. Nightingale, C SW NE section 32-16n-104, South Baxter Basin, the first of several wells to be drilled this year. It is a half a mile southwest of the nearest gas well and will prove up an extension of the gas area. It will go to the Frontier at around 2,300 feet.

Washakie County

Bruce C. Teeters No. 1 Brome-Gov't, CNL SW NW sec. 31-48n-90w. Spd. April 4; drlg. 1,435 ft. (first report).

Wyoming O. & R. Co. No. 2 Gov't, NW SW SW sec. 31-48n-90w. Drlg. 1,695 ft.; may P.B. to 1,400 ft. to str.

Weston County

Production in the Osage field in April was 24,117 bbls. and deliveries to refineries 24,000 bbls. Operators are not undertaking any drilling campaign in Osage this summer as a result of the success in heating wells, which is increasing production above what might be expected from the drilling of new wells. This process, outlined in this column a few weeks ago, is showing some interesting results. A check made by Frank V. Eaton shows, for example, that Hugh Updike No. 1 in section 36-36-64, drilled in 1922, was down to 2 bbls. daily and responded to heating by making 70 bbls. initial and settling to 40 bbls. The Lambie Oil Co. No. 8, section 14-46-64, increased from 2 to 30 bbls. The old Sinclair well drilled in 1921, now operated by the Wyoming Oil & Gas Co., came back to 92 bbls. on second heating.

Conway Oil Corp. No. 1 Gov't, C SE NW sec. 7-41n-60w. T.D. 2,304 ft.; running 3-in. tubing to test show oil in Pasha-sapa (Madison).

MONTANA

Fallon County

Montana-Dakota Utilities Co. No. 1, NE NW sec. 17-4n-6e. T.D. 6,797 ft.; cmtd. 6⅝-in. and ready to drill in.

Fergus County

Minnesota Co. No. 1 Fenholt, SE NW SW sec. 24-21n-18e. Drlg. 2,155 ft.

Judith Operating Co. No. 2 Government, NW NE sec. 35-22n-17e. Drlg. 902 ft.

H. C. Rowland No. 3 Government, CEL NE SW sec. 18-17n-24e. Spdg. 50 ft.

Kalispel-Kevin Oil Co. No. 2 Emmons, C SW SE sec. 20-21-18e. Drlg. 576 ft.

Glacier County

Four wells were completed and four new operations were reported in the Cut Bank field.

Jack Marshall No. 1 Tribal-120, Lot 7, NE NE section 7-32-5w, an outpost well in the southern part of the field, was completed at 2,970 feet, total depth, but on account of bad casing was not given a swabbing test. The 7-inch was cemented at 2,743 feet and 150 feet of 5⅜-inch liner at 2,832 feet. The Sunburst sand at 2,832-40 feet had a show of oil. The top of the Cut Bank was at 2,911 feet and the pay at 2,964-68 feet.

Anderson and others No. 1 Anderson, NE SW NW section 26-35-6w, reported with 1,000 feet of oil in the hole at 2,871 feet last week, swabbed 12 bbls. first 24 hours before a shot and 50 bbls. first 24 hours after a shot and after head was off.

The Par Oil Co. No. 6 Haines, NE SW SE section 2-34-6w, swabbed 140 bbls. first 24 hours at a total depth of 2,909 feet from the pay at 2,870-98 feet.

The Santa Rita Oil & Gas Co. No. 1 Shearon, CEL NE NE section 34-36-6w, is shut down at 3,165 feet for a test on the fluid level after oil rose only 75 feet. The Sunburst at 3,054-65 feet was dry. The top of the Cut Bank was at 3,081 feet and the pay at 3,110-35 feet.

Cobb-Pardee No. 1 Stufft, C SE NW sec. 25-36n-6w. Drlg. 2,825 ft.; carrying 7-in. at 2,785 ft.

Cobb-Pardee No. 2 Morrison, CEL NE SE sec. 24-33n-6w. Rig.

Consol. Gas Co. No. 1 Allotted-114, CNL NE SW sec. 31-33n-5w. Colo. at 435 ft.; 10-in. at 475 ft.; W.O.C.

A. E. Crumley No. 2, Allotted-113, SW NW SE sec. 31-33n-5w. Cellar (first report).

Dakota-Montana Oil Co. No. 1 Winkler, SW NE NW sec. 36-35n-6w. T.D. 2,160 ft.; rebldg. rig.

Goodman Oil Co. No. 1 Tribal, SW NW SW sec. 25-33n-6w. Sand 2,420-45 ft.; 1 bbl. wtr. per hr.; 8¾-in. cmtd. 2,535 ft.

Hannah-Porter Co. No. 1 Allotted-130, C Lot 3, sec. 6-32n-5. R.U.

B. V. Hole No. 1 Tribal, C NW SW sec. 33n-6w. Cellar.

B. V. Hole No. 1 Allotted-124, 640 ft. out of NE cor. sec. 1-32-6w. Loc.

R. C. Jeffries No. 4-A Lukens, NE NE NE sec. 12-33n-6w. Drlg. 2,175 ft.

Kincheloe-Hanlon No. 2 State, NE NE NE sec. 36-33n-6w. R.U.

Kately No. 3 Drumheller-Ward, C Lot 2, sec. 10-34n-6w. Drlg. 2,585 ft.

Montana Headlight Oil Co. No. 3 Britton, NE NE SE sec. 11-34n-6w. Drlg. 2,640 ft.

Montana Power Gas Co. No. 2 Van Ormer, C SE SE sec. 8-33n-5w. Drlg. 2,350 ft.

Montana Power Gas Co. No. 4 Seeba, SW SW NW sec. 2-34n-6w. Cellar (first report).

Montana Power Gas Co. No. 1 Warfield unit, CWL SW sec. 9-33n-5w. Drlg. 2,250 ft.

Montana Power Gas Co. No. 1 Carrigeaux, 125 ft. W of C NE NW sec. 28-33n-5w. Drlg. 1,600 ft.

Nadeaux Bros. No. 3 Farmers State Bank, C SW NE sec. 17-33n-5w. Drlg. 1,700 ft.

Santa Rita O. & G. Co. No. 1 McCabe, NE SW NW sec. 31 33n-5w. Bldg. rig (first report).

Santa Rita O. & G. Co. No. 1 Barrington, SE SW NW sec. 24-33n-6w. Cmtd. 7-in. at 2,860 ft.; W.O.C.

Neil Spencer No. 2 Tweedy, 925 ft. NS line, 1,980 ft. 2 WL SE sec. 25-33n-6w. Drlg. 675 ft.; Colo. 585 ft.; 10-in. 620 ft.

H. R. Patterson, No. 1 Miller, C NE NE sec. 1-33n-6w. M.I.M. (first report).

Stanley Gray No. 1 Allotted-132, NW SE NW sec. 22-34n-7w. Drlg. 1,165 ft.; Colo. 1,060 ft.; 10-in. 1,064 ft.

R. C. Tarrant No. 6 Britton, C SE SW sec. 12-34n-6w. Drlg. 940 ft.; drlg. 1,320 ft.

R. C. Tarrant No. 2 Reikhoff, SE NE SE sec. 3-34n-6w. Drlg. 2,300 ft.

Tarrant-Long, No. 5 Miller, C NE NE sec. 24-34n-6w. Drlg. 560 ft.; 10-in. at 495 ft.

Texas Co. No. 2-B Allotted-122, SE NW

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GENERAL OFFICES:
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NW sec. 6-32n-5w. T.D. 2,844 ft.; 7-in. at 2,835 ft.; W.O.C.
Texas Co. No. 1 Govt., C SW NE sec. 17-32n-5w. Bldg. rig (first report).
Texas Co. No. 6 Morrison, 660 ft. S of NW cor. sec. 22-35n-6w. Drlg. 992 ft.; 10-in. at 300 ft.; (first report).
Texas Co. No. 2, Unit 9, C SW NE sec. 9-32n-5w, R.U.
Whetstone et al No. 1 Tribal, C SE NW sec. 36-33n-6w. Set 7-in. at 2,930 ft.; W.O.C.
Wilkinson et al No. 1 Tribal, Tr. 127, C NE NE sec. 1-32n-6w. R. U.
Wilkinson et al No. 1 Tribal, 126, C NE NW sec. 7-32n-5w. Drlg. 850 ft.; 10-in. at 835 ft.

Petroleum County

West Dome Oil Co. No. 1, SW SE NE sec. 9-16n-29e. Drlg. 1,293 ft.; first Cat Creek at 1,240-88 ft.; (est. 5 bbls.); cased off with 5 3/16-in. at 1,290 ft.

Judith Basin County

Fletcher E. Hunt No. 3, NW SE NE sec. 20-14n-15w. Drlg. 431 ft.

Pondera County

Wm. M. Fulton No. 1 Price, SW NE NE sec. 18-27-4w. P.B. to 1,300 ft.; sidetrkg.
Clinch Pet., Ltd., No. 1 Hollan, NW SW NW sec. 12-28-6w. Drlg. 2,000 ft.
Warren Hastings No. 2 Erickson, NW SW NW sec. 10-27n-4w. Drlg. 1,090 ft.
Texas Co. No. 1 Valier Unit No. 1, C NW SE sec. 32-31n-5w. Drlg. 1,095 ft.; Colo. 540 ft.
Gordon Campbell No. 1 Hughes, NW NE NW sec. 12-30n-4w. R.O.G. (cor.).
Jones-Chambers No. 1 Erickson, SW SW SW sec. 3-27-4w. Rig timbers on loc.

Teton County

R. C. Tarrant No. 1 Wallenstein, NW NW SW sec. 9-27n-5w. Bldg. rig.

Toole County

The Kevin-Sunburst field is getting into its summer drilling campaign with 16 active operations under way. Imperial-Craig Oil Co. No. 3 Martin, CEL SW SE section 18-35-1w, last week reported standing completed with only 60 feet of oil in the hole, is pumping 25 bbls. per day after acidizing. Eddy & Engleking No. 1 Sohn, SW cor. NE section 26-35-3w, was a failure at 1,648 feet and was plugged and abandoned. The Ellis-Madison, topped at 1,645 feet, was dry. Three new locations were made the past week.

A. E. Crumley No. 9 Shaw, SE SW NE sec. 35-36n-2w. R.O.G. (first report).
A. E. Crumley No. 6 Fryberger, NE SE SE sec. 24-35n-3w. Drlg. 1,200 ft.
Big West Oil Co. No. 1 Dalquist, SW NE NW sec. 21-35n-3w. Drlg. 1,385 ft.
Carscallen & Mitchener No. 1 Krueger, 1,320 ft. W of E line, 1,980 ft. S of N line, sec. 10-34n-2w. T.D. 1,650 ft.; acidised; did not recover load.
Coolidge & Coolidge No. 2 Shaw, SE SE SE sec. 26-36n-2w. Drlg. 650 ft.
Continental Oil Co. No. 7 State, SE NE NE sec. 16-35n-2w. M.I.M.; contract to Pevol & Shayt
Fraser & Smith No. 1 Crabtree, NE NE SE sec. 14-34n-2w. Drlg. 1,152 ft.
Imperial-Craig Oil Co. No. 17 Bluhm, CWL NE NE sec. 19-35n-1w. Spdg.
Imperial-Craig Oil Co. No. 18 Bluhm, NW NE NE sec. 19-35n-1w. R.O.G.
T. P. Kyle No. 1 Wolnsti, C SE SE sec. 3-33n-1w. R.O.G. (first report).
Monopog Oils, Ltd., No. 2 Dipple, CSL SW NW sec. 28-35n-1w. T.D. 1,450 ft.; R.U. to drill in.
Munger No. 1 Thornton, NW SW SW sec. 8-35n-2w. Loc. Spdg. 10 ft.
Burt Smith No. 1 Haugen, SE SE NW sec. 2-35n-3w. S.D. 1,245 ft. (loc. cor.).
Welch Bros. No. 1 Dewald, SW NE NE sec. 26-36n-2w. T.D. 1,523 ft.; running 6⅝-in.
Watson No. 1 Leach, SE SE NE sec. 31-35n-3w. R.O.G.
Superior Oil Co. No. 4 Haugen, SW SE NE sec. 11-35n-3w. T.D. 1,692 ft.; running 6⅝-in.
Nopstead & Vanderpas No. 1 Solberg, NE NW SE sec. 20-35n-3w. Spdg.
R. C. White No. 2 Haugan, CNL NE SE sec. 11-35n-3w. R.O.G. (first report).

UTAH

Utah County

Diamond Oil Co. No. 4 Govt., CSL SE NW sec. 16-8s-5e. S.D. 3,956 ft. in petroleum residue substance.

Summit County

Longwell Pet. Co. No. 1, SE SW SE sec. 35-3n-5e. Drlg. 1,240 ft.

Washington County

Arrowhead Pet. Corp. No. 1-A, SE SW NE sec. 1-43s-15w. T.D. 2,475 ft.; side-tracking tools; good show oil.

Grand County

Columbia Crude Co. No. 1 Rath, SW SE sec. 13-25n-20e. Drlg. 515 ft. in upper Hermosa.
Utah Southern Oil Co. No. 1 Hyde, SE NW NW sec. 33-22e. S.D. 4,880 ft. to resurvey; went through 2,400 ft. of Permian, Rico and Cutler beds.
Glenn Ruby et al No. 1 State, NE SE SE sec. 34-31s-16e. Drlg. 1,935 ft. in sand.

Kansas Fields

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tion 9-24-4w (formerly reported as C SW SW section 9-24-4w), rigging up rotary.

Sinclair Prairie Oil Co. No. 1 Baker, C SW NE section 10-24-4w, was acidized with 1,000 gallons and flowed 451 bbls. in 21 hours. It was reacidized with 3,000 gallons and flowed 505 bbls. in 21 hours. Chat was topped at 3,295 feet; total depth, 3,365 feet. Shell Petroleum Corp. No. 1 Whipple, C W half W half NW section 14-26-9w, in the Lerado area, was acidized with 3,000 gallons and flowed 625 bbls. in eight hours, flowing more than 100 bbls. an hour the last three hours. Viola lime was topped at 4,126 feet; total depth, 4,414 feet.

Harvey County

The only Harvey County completion was an old well drilled deeper without getting production. Sinclair Prairie Oil Co. No. 5 Martens, SW NW SE section 19-22-3w, in the Hollow-Nikkel area, topped Siliceous lime at 3,624 feet; had a hole full of water at 3,633 feet, total depth; plugged back several times, encountering water, and was dry and abandoned at plugged back depth of 3,130 feet.

One new test was reported in the Sperling area of Harvey County. The Derby Oil Co. No. 1 Lehman, SW SW NW section 13-22-2w, was a location.

Rush County

Work started at one new test in the Otis gas field of Rush County. Inter-State Producing Co. and others No. 1 Schmidt, C SE section 9-18-16w, was drilling below 405 feet.

McPherson County

McPherson Oil & Gas Co. No. 6 Chindberg, NW SW NW section 32-18-2w, in the McPherson area of McPherson County, had dug ponds. W. C. McBride, Inc., No. 5 Whitright, C N half N half SW section 30-19-1w, was building rig.

Ellsworth County

An Ellsworth County wildcat failed to find production and was dry and abandoned. It was Empire Oil & Refining Co. and others No. 1 Theo. Kroesch, NW NW SE section 33-17-9w, southwest of the Lorraine field. It topped Kansas City lime at 2,890 feet; had a hole full of water at 2,990-3,003 feet; Conglomerate, 3,208 feet; Siliceous lime, 3,260-74 feet, total depth, with a hole full of water.

One new test was started in Ellsworth County. James Davis No. 3 Edwards, SE SW SE section 34-17-8w, was a cellar.

Carter Oil Co. and others No. 2 Groth, C S half S half SW section 23-17-9w, Lorraine area, pumped 136 bbls. of oil in 12 hours and was to be acidized. It topped Siliceous lime at 3,181 feet and was bottomed at 3,189 feet.

Sumner County

One producer was completed in the Wellington area of Sumner County. Sinclair Prairie Oil Co. No. 8 Kamis, SE NE SW section 28-31-1w, made potential of 203 bbls. of oil after acidizing and was completed at 3,686 feet, total depth. It was producing from Chat topped at 3,648 feet.

One new test was started and one old well was preparing to deepen in Sumner County. E. B. Shawver No. 4 Frankum, SE SE NE section 32-31-1w, was moving in material. Shell Petroleum Corp. was rigging up to deepen No. 14 Emrich, NW SW SW NE section 14-32-2, an old Oxford well.

Rooks County

Helmerich & Payne and others No. 1 Bedard, C NE section 29-9-19w, the only new operation in Rooks County, was building rotary rig. This is a wildcat test on a subsurface trend northwest of Zurich in the southwestern part of the county.

Cowley County

Roth & Faurot and Texas Co. No. 2 David "A," NW NE SW section 35-30-4, in the David sector of Cowley County, made potential of 142 bbls. of oil after a shot with 40 quarts and was completed at 2,974 feet, total depth. Pay sand was had at 2,948-68 feet.

Woodson County

The six Woodson County completions were divided equally between producers and failures. C. L. Sheedy No. 5 Klick, NW SW SE section 20-25-14, at the east end of the Quincy pool, made potential of 325 bbls. after a shot with 140 quarts. It had sand at 1,401-34 feet and was bottomed at 1,465 feet. Same operator's No. 4 Klick, SE cor. section 20-25-14, had sand at 1,416-46 feet; total depth, 1,460 feet; was shot with 140 quarts and made potential of 200 bbls. C. L. Sheedy and others No. 1 H. W. Tipton, NE cor. section 2-25-14, made potential of 150 bbls. after a shot with 120 quarts and was completed at 1,480 feet, total depth. Production was from sand at 1,385-1,435 feet.

Mendenhall and others No. 1 Hunter, NE cor. section 36-25-14, wildcat, was dry and abandoned with a hole full of water in sand at 1,485-1,502 feet, total depth. Roy Johnson No. 1 Hare, C N half NW NE section 32-25-14, wildcat, was dry and abandoned at 1,452 feet, total depth. C. L. Sheedy No. 1 Baker, SE SE NW section 2-26-14, wildcat, was dry and abandoned at 1,577 feet, total depth.

One new wildcat test was reported in Woodson County. C. L. Sheedy No. 1 Abbott, NE NE SE section 16-25-14, was rigging up machine.

Coffey County

Henderson & Holden No. 1-A Levering, NE NE SE section 12-23-14, in the Van Noy area of Coffey County, was dry and abandoned at 1,693 feet, total depth. No new work was reported in Coffey County.

Butler County

Rex & Morris No. 1 Olson, NW SW SE section 15-28-6, wildcat south of the Kramer pool in Butler County, had spudded. It was the only new work reported in the county.

Seward County

Helmerich & Payne staked location for No. 1 Hyde, C SW section 14-31-34w, wildcat on a gas trend in northwestern Seward County.

Greenwood County

Houston-Oklahoma No. 2 Hout, SW cor. section 11-24-12, in the Virgil area of Greenwood County, had sand at 1,773-75 feet, but the hole filled with water at 1,778 feet, total depth, and it was dry and abandoned.

Work was started at two new Greenwood County tests. Shull Drilling Co. No. 2-B Hinchman, SW SW NE section 17-24-13, was drilling below 850 feet. Shaffer & Howell No. 5 Sauder, NW NE SE section 16-23-13, was drilling below 720 feet.

Grant County

Piney Oil & Gas Co. No. 1 English, C NW section 3-29-36w, in Grant County, set 8-inch casing at 2,404 feet and was waiting on cement at 2,408 feet. Location of this test previously was reported as C SW section 3.

Haskell County

Kuhn Brothers and others No. 1 Nilson, C SW SE section 21-28-32w, in Haskell County, was rigging up rotary. Location previously had been announced as SW SW SE section 21.

Drilling Contractors

(Continued from Page 133)

in St. Mary Parish and is drilling ahead on two other wells in the field for the same company. No. 2 Banta is bottomed in sand at 6,655 feet and casing is being cemented, No. 3 Carter is coring below 6,259 feet and No. 1 Carter is drilling in shale below 8,300 feet.

Smith & McDannald have cemented 7,818 feet of 7-inch casing on No. 1 fee in the St. Martinsville field in St. Martin Parish and is preparing to test several possible oil sands which were indicated on an electrical coring test. In the same field for the Tide Water Oil Co. No. 2 Smedes which was completed for a gas well, is being recompleted after making a squeeze out cement job at 6,640-50 feet. For themselves at the South Houston field, No. 1 Phillips is bottomed in oil sand 4,780 feet and 7-inch casing has been cemented at 4,640 feet. Seven other rigs are located as follows: One in Zavala County for Bay Oil Corp., one at Jennings for Shell Petroleum Corp., one at Hastings and South Houston field for Stanolind Oil & Gas Co., one in East Texas for Tide Water Oil Co., one at Long Lake for Texas Co. and one in Wharton County for themselves.

Trinity Drillers, Inc., of San Antonio extended operations into Nueces County this week. Rig is being moved in on the No. 3 Flato location to be drilled for the Shell Petroleum Co. in the Saxet field. In the Driscoll field of Duval County, the No. 9-A Sevier is down below 2,000 feet for the Continental Oil Co. The S.R.C. Oil Co. No. 17-E Trevino was completed in the Escobas field of Zapata County during the week, and pipe is on the sand in the Superior Oil Co. No. 7-A Billings in Lopez, Webb County.

Al Buchanan completed three producers in the Plymouth field for the Plymouth Oil Co., and has set casing on the deep 6,100-foot sand cored in the Benedum & Trees No. 2 Welder wildcat west of the field. Active rigs in Duval County are drilling in five fields. In Seven Sisters, Buchanan crews completed Humble Oil & Refining Co. No. 16-A Serna and Blanco Oil Co. No. 3-B Welder. In Loma Novia, where rigs are drilling for Humble and Texas companies, one completion, Humble No. 60-B Hubbard, was made. Other activities include drilling in Piedra Lumbre for Humble, Labbe for Stanolind and Loma Vista for Shell.

East and East Central Texas

TALCO FIELD IS DUE FOR BIG DEVELOPMENT THIS SUMMER

By
L. E. BREDBERG

DALLAS, Tex., May 18.—The Talco field in northeast Titus and northwest Franklin County made a bid for more interest and possibly major attraction this week when two wells, one a mile southeast extension and the other a 2-mile east extension, came in making good wells, although the 2-mile eastern extension is on a lease on which one test already drilled sufficiently deep to make a producer from the Paluxy sand, failed to do so and has been temporarily abandoned by the owner, Humble Oil & Refining Co. However, that test, No. 1 Groves, in the Ben Jones Survey, is to be carried deeper from its present depth to 4,475 feet.

Humble No. 2 Groves, about a quarter of a mile due south of No. 1 Groves, and in the same survey, is making an initial production of 527 bbls. in 24 hours through one-quarter inch tubing choke, the best well yet completed in the area. Total depth is 4,355 feet, and the well was said to have cored around 150 feet of Paluxy sand, although this was not solid sand. However, coring the well showed a thick producing sand section in the area, and the discovery well of Peveto and others is to be carried deeper on the Mary Carr lands. Total depth of that test is 4.208 feet, and it only cored a few feet of sand before completing. However, they now have plenty of leeway for drilling deeper, as proven by the Galt and Groves wells.

Humble Oil & Refining Co. No. 1 Galt, in the R. I. Wynne Survey, about 1 mile southeast of the discovery well, was completed this week for an initial production of 332 bbls. in 18 hours through one-quarter inch choke, or 428 bbls. in 24 hours. A test is to be started immediately about 1 mile south of this test, which will be an interesting test in that it will be reaching out in search of production to the south of the fault, and possibly in dangerous territory.

The Tide Water Oil Co. made a location this week for No. 1 Carr in the M. V. Delgado Survey. Same is 990 feet from the north and 330 feet from the west of a 75-acre lease. Derrick is up and spudding will take place this week. It is on an offset lease to the east of the discovery well.

The Magnolia Petroleum Co., drilling a west offset to the discovery, on the Carr lands in the Delgado Survey, is now rigging up cable tools to drill in. There is but little gas in the wells in this area and future tests may all be drilled in with cable tools, this method possibly proving better than completing with rotary. Peveto and others have rigged up machine to drill deeper with cable tools on their discovery.

The Lucey Petroleum Co. No. 1 Crawford, in the O. James Survey, to the north of the Windsor and Humble 2½-mile west extension to the Talco field, but in Franklin County, is another test due for completion in the pool within a week's time. Seven-inch casing was set at 4,135 feet, total depth of the hole standing at 4,300 feet in sand.

Two tests in the Talco townsite are making hole, Nemo Oil Co. and Ownby Drilling Co.'s tests.

J. P. Parris, Jr. of Tyler, has made location for a test on the Kate Moore lands in the M. V. Delgado Survey, and the Peninsula Oil Co. of Fort Worth is to drill on the J. T. Belcher lands in the same survey, both tests to be in Titus County. Since the completion of two good wells in the pool in the past week operators holding leases are more confident of the possibilities of the area and will start a number of wells at once, the pool to be an active one in drilling operations within the next month or two.

R. C. Horne of Dallas has made a location on J. F. Barton tract in the Delgado Survey in Titus County, and Lucey Petroleum Co. of Dallas has announced another location for the area on the W. E. Franklin lands in the J. M. Nugent Survey, in the same county. The newly opened area will vie with the Cass County extensions of the Rodessa field in importance in the East Texas district, the area becoming more and more important as more wells are completed, and the field extended.

Of Keen Interest

C. F. Lytle No. 1 Thompson, in the Pedro Varella Survey, in the old Mexia field, Limestone County, aroused interest and curiosity this week when it was reported as a Trinity sand producer at around 6,064 feet. The test has been a mystery test due to major companies withholding aid in drilling the well. Some 300 bbls. of oil was used in circulating the hole, and when test was made the well started flowing, producing this oil and at first looking for a new Trinity sand discovery, on the south end of the Fault Plane in the East Texas district. However, it was later proved that the flow was caused by hot salt water, and most of the oil coming from the hole was that which had been used for circulating.

In coring from 6,045 feet to 6,064 feet, recovery was reported to have consisted of hard tight sand in the top part, with 2 feet of slightly saturated sand in the middle of the core, white and grayish sand being cored near the bottom. Seven-inch casing was believed to have been set at around 6,150 feet. The hole will be plugged back in an effort to shut off the water and there is a possibility that the test will yet prove a producer. If this test proves a Trinity sand producer, then more drilling will take place all along the fault plane to the north and northeast through the Talco field, companies and operators seeking the deeper production, such as found at Talco. This is the third deep test drilled in the Mexia field in quest of Trinity sand production, the first one, drilled by the E. L. Smith Oil Co., producing some oil, and the second, drilled last year by Peyton Brothers, also logging good showings of oil and gas in the deeper strata.

Cherokee Salt

The Humble Oil & Refining Co. No. 1 S. D. Goodson, in the W. I. Reynolds Survey, 4 miles southwest of Jacksonville, Cherokee County, has been an interesting test for the past couple of weeks, but this week it salted up, showing 450 feet of salt water on an 11-minute drill stem test made from 4,814-57 feet. It is drilling deeper, around 4,900 feet at the present writing.

Tops Anhydrite

Pure Oil Co. No. 1 Faulkner, interesting deep wildcat on the company's Mount Enterprise block in the southern part of Rusk County, located in the William Elliott Survey, topped anhydrite at 5,320 feet this week and is drilling ahead around 5,350 feet. This test is scheduled to go to around 8,500 feet in quest of Trinity sand production and leases and royalties have sold at high prices in the past few months. The company holds a large block of leases running in a somewhat narrow stretch from the east to the west.

Wildcat Locations

The Westmount Oil Co. has staked location for an extreme wildcat test on the R. N. Phillips farm, in the J. N. Hancock Survey, 10 miles north of Oak Grove in Bowie County, and has moved in derrick. In Van Zandt County, 2 miles north of Grand Saline, A. W. Walker and others have staked location for a wildcat on the C. M. Whitaker lands in the T. Buckley Survey.

L. B. Moore of Whitewright, Tex., has staked location for a wildcat on the R. W. Moore farm in the Owenshaw Survey in Fannin County, and Roger Steward of Fairfield has permit to drill a wildcat on lands of the Trinity Farm Securities Co., in R. M. Williamson Survey, Freestone County. George E. Ginter and others of Lufkin have location for a test on lands of the Copes heirs, in the Jose Morino Survey, Angelina County.

Wildcat Abandonments

Six wildcat test abandonments were reported for the district this week. Joiner No. 1 Huernish Heirs, located about 12 miles southeast of the Talco pool in Titus County, was given up at a total depth of 4,644 feet. The Georgetown lime was topped at 4,220 feet, the test running too low to have any chance to make a producer from the Trinity series. Elevation is 317 feet.

Wilson and others abandoned their No. 1 fee test, 5 miles north of Malakoff in Henderson County, at a total depth of 2,800 feet, and Pearson abandoned his No. 1 Martin in Kaufman County at a total depth of 2,200 feet. It is located 2 miles northeast of Kemp. Elevation is 429 feet. Two wildcats were abandoned in Morris County. Raycoatuc, Inc., gave up its No. 1 Staggers, 1½ miles north of Cason at a total depth of 4,566 feet, with an elevation of 369 feet, and Steve Rotondi abandoned No. 1 Smith, 2½ miles southwest of Naples at 4,105 feet. Elevation is 429 feet.

One mile southwest of Currie in Navarro County, W. A. Reiter abandoned his No. 2 Bounds at a total depth of 3,465 feet. The Woodbine was topped at 3,399 feet and the sand at 3,429 feet.

East Texas Field

Of interest to those in the industry at large, and especially to those operating in the East Texas field, was the Federal Court's findings in regard to transporting Rodessa, Louisiana, oil into or through Texas; a sale of considerable import and the upholding of Rule 37 by the Austin Court of Civil Appeals.

Roeser and Pendleton, Inc., of Fort Worth, sold its interest in 65 wells and some 475 acres, located on 11 separate leases in the East Texas field to A. H. Meadows and R. B. Trippitt of Shreveport, for a reported consideration of $400,000 in cash and $1,200,000 out of one-half of the oil to be produced. The rest of the interest in these properties is held by J. K. Wadley of Texarkana, Magnolia Petroleum Co. and W. R. Nicholson of Longview. The net interest held by the vendors was 29¾ wells, the company holding only a quarter interest in 11 of the wells. There are 30 locations yet to be drilled on the leases. The wells have a daily allowable of some 1,300 bbls., which will now be turned to the Gilliland refinery at Gladewater, since the new owners are associated with the Gilliland interests. The Stanolind Pipe Line Co. and Magnolia Pipe Line Co. have been taking most of the oil in the past.

Daily Well Allowable Cut

The daily per well allowable in the East Texas field was cut back from 2.76 to 2.6 per cent of the hourly potential this week by the Railroad Commission in an effort to keep the daily output around 440,000 bbls.

The bottom-hole pressure of the East Texas field was 1,190.02 pounds per square inch as of May 12, according to the engineering department of the Railroad Commission. This is a drop of 7 pounds in a month's time.

The Austin Court of Civil Appeals

reversed a lower court decision pertaining to a well to be drilled, the second one, on a 2.75-acre tract in the East Texas field, and granted an injunction against the company proposing to drill such an exception to Rule 37 which pertains to the spacing of drilling wells to 330 feet from lease lines or 660 feet from any other well. A major company, holding a lease adjoining the 2.75-acre tract in question, asked for an injunction to prevent the drilling of a second well on the tract, on the grounds of waste and drainage. The higher court granted the injunction prayed for by the major producing unit. This is an important decision in view of the fact that the Railroad Commission has been granting many permits to drill exception permits, this decision possibly stopping such permit granting in the future unless the case is carried to a higher court and won by the company proposing to drill the exception well.

Locations and Completions

There were over 60 locations staked in the East Texas field this week with 51 tests completed, 2 proving dry holes and defining wells. Nine pumpers were listed on the completion report, two were completed swabbing and two were completed making some water, one 20 per cent and the other 10 per cent, with the oil.

Water Report

There are now some 1,300 wells in the East Texas field showing various percentages of salt water, or 6.8 per cent of the total number of producers in the field. Some 2,400 wells are pumpers, or about 10 per cent of the producers. Many wells have been rigged for pumping, but have not yet needed to be placed on the beam, but with bottom-hole pressures going off as production continues to draw from the reservoir of the field, will place more of these equipped wells to pumping.

EAST TEXAS FIELD

Gregg County

Arkansas Fuel Oil Co. No. 15 Calvin, 3,528-53 feet, 26 bbls. in 15 minutes; No. 17-A McKinley, 3,602-27 feet, 22 bbls. in 15 minutes. Grisham & Hunter No. 5 Texas & Pacific Railroad, 3,590-91 feet, 40 bbls. per hour. Stanolind Oil & Gas Co. No. 14 Fenton, 3,599-3,630 feet, 12 bbls. in 15 minutes; No. 9-A Smith 3,540-82 feet, 20 bbls. in 15 minutes; No. 14 Key, 3,528-3,628 feet, 75 bbls. per hour; No. 6 LeMarie, 3,555-3,632 feet, 15 bbls. in 15 minutes. Adams and Lyle No. 2 Williams, 3,606-07 feet, 20 bbls. in 20 minutes. Beard No. 10 Elder, 3,508-25 feet, 25 bbls. per hour. Flanigan Production Co. No. 7 Walker, 3,589-94 feet, 35 bbls. in 30 minutes. Gulf Oil Corp. No. 27 Holt, 3,622-36 feet, 20 bbls. in 20 minutes. Hunter & Rowe No. 4 Still, 3,549-72 feet, 4 bbls. per hour on pump. Kinso Oil Co. No. 6 Wells, 3,655-57 feet, 27 bbls. per hour. Lee & Williams No. 3-A Carter, 3,589-90 feet, 30 bbls. per hour. Rush No. 3-B Crews, 3,601-02 feet, 20 bbls. per hour. Sinclair Prairie Oil Co. No. 43-B King, 3,457-3,500 feet, 31 bbls. in 20 minutes; No. 44-B King, 3,445-75 feet, 25 bbls. in 15 minutes. T.W.M. Oil Co. No. 4 River, Tract 1, 3,570-84 feet, 20 bbls. in 30 minutes.

Rusk County

Allen and others No. 2 Dickerson, 3,590-3,660 feet, 20 bbls. in six hours on pump. Dunham No. 9 Scoggins, 3,652-3,653 feet, 20 bbls. in 30 minutes. Humble Oil & Refining Co. No. 7-B Laird, 3,534-80 feet, 42 bbls. per hour. Hurtle Oil Co. No. 5-B Sexton, 3,580-3,640 feet, 10 bbls. per hour on pump; No. 18-B Sexton, 3,567-3,601 feet, 5 bbls. per hour on pump. Royal Petroleum No. 3 Taylor, 3,516-89 feet, 20 bbls. in six hours on pump. Shell Petroleum Corp. No. 18 Moore, 3,686-96 feet, 80 bbls. per hour. Sladek No. 1 Motley, 3,768 feet, 35 bbls. in six hours, 20 per cent salt water, on pump. Tide Water Oil Co. No. 17 Leverett, 3,632-55 feet, 80 bbls. per hour. Farrell & Co. No. 4 Hammett, 3,658-64 feet, 23 bbls. in 12 hours, 10 per cent salt water, swabbing. Gilcrease Oil Co. No. 7 Bradford, 3,600-60 feet, 60 bbls. per hour. Hanbury No. 1-A Curbo, 3,633-40 feet, 20 bbls in three hours on pump. Humble Oil & Refining Co. No. 54-A Kangerga, 3,665-99 feet, 67 bbls. per hour; No. 55-A Kangerga, 3,625-56 feet, 68 bbls. per hour. McMurray No. 1 Dickerson, 3,647-3,668 feet, 64 bbls. per hour. Petroleum Marketing Co. No. 3-A Graham, dry and abandoned 3,680 feet. Royal Petroleum Co. No. 5 Wooley, 3,561-3,612 feet, 20 bbls. in 11 hours on pump. Slaughter and Kugle No. 5 Frederick, 3,578-3,600 feet, 20 bbls. per hour, swabbing.

Smith County

Gulf Oil Corp. No. 11 Wiley, 3,749-3,553 feet, 40 bbls. per hour through three-quarters inch choke. Hanbury No. 1 Sharp, 3,701-03 feet, 50 bbls. per hour. Sells Petroleum Corp. No. 2 Moore, 3,815-16 feet, 60 bbls. per hour. Sinclair Prairie Oil Co. No. 65-A Mayfield, 3,852-53 feet, 60 bbls. per hour; No. 66-A Mayfield, 3,792-94 feet, 20 bbls. in 20 minutes. Texas-Canadian Oil Co. No. 1 Blackwell, 3,792-3,830 feet, dry and abandoned.

Cherokee County

Droppleman Drilling Co. No. 4 Kelley, 3,707-08 feet, 60 bbls. per hour.

Upshur County

Alger Oil Co. No. 11 Wells, 3,707-08 feet, 25 bbls. per hour. Gulf Oil Corp. No. 14 Ray, 3,583-89 feet, 30 bbls. per hour. Red Iron Drilling Co. No. 1 Victory, 3,687-88 feet, 20 bbls. per day on pump. Manziel No. 5 Mackey, 3,755-58 feet, 30 bbls. per hour. Papadakis No. 1 Cone-Williams, 3,733-34 feet, 40 bbls. per hour. Rutledge & Boller No. 4 Todd, 3,740-44 feet, 30 bbls. per hour; No. 9 Todd, 3,726-31 feet, 30 bbls per hour. Sun Oil Co. No. 2 Mackey, 3,688-90 feet, 25 bbls. per hour.

Miscellaneous Completions

Anderson County

Coretex Oil Co. No. 1 J. W. Barton, total depth 4,086 feet, 143 bbls. in 24 hours through one-eighth inch choke.

Freestone County

Tide Water and Seaboard Oil Co. No. 2 Johnson, total depth 5,297 feet, 144 bbls. in 24 hours through one-eighth inch choke.

Henderson County

Wilson and others No. 1 fee, dry and abandoned at 2,800 feet; 5 miles north of Malakoff.

Titus County

Humble Oil & Refining Co. No. 1 Galt, total depth 4,349 feet, 332 bbls. in 18 hours through one-quarter inch choke; No. 2 Groves, total depth 4,355 feet, 356 bbls. in 17 hours through one-quarter inch choke. Joiner No. 1 Huernish heirs, dry and abandoned at 4,644 feet; elevation 317 feet; top Georgetown 4,220 feet.

Kaufman County

Pearson No. 1 Martin, dry and abandoned at 2,200 feet; elevation 429 feet; 2 miles northeast of Kemp.

Morris County

Raycoatuc, Inc., No. 1 Staggers, dry and abandoned at 4,566 feet; elevation 369 feet; 1½ miles north of Cason. Rotondi No. 1 Smith, dry and abandoned at 4,105 feet; elevation 429 feet; 2½ miles southwest of Naples.

Navarro County

W. A. Reiter No. 2 Bounds, dry and abandoned at 3,465 feet, top Woodbine 3,399 feet, top sand 3,429 feet; 1 mile southwest of Currie.

Canadian Fields

(Continued from Page 132)

discovery well drilled in 1910. Completion of the new test to the gas sand is expected by July. The Canadian Western company system in Brooks is separate from its main transmission system and draws its supply from local wells.

McMurray Operations

In the McMurray district of northern Alberta, Abasand Oils, Ltd., of Toronto has completed survey for a road from the end of the railroad to its plant site. Road construction will be commenced this month. The initial plant is being constructed at Kingston and after test runs there will be shipped to the field, where it is to be in operation by August. The output will include gasoline, tractor and diesel fuels, asphalts and road oils; but no lubricating oils will be manufactured in the early stages of operation.

New York and Montreal syndicates are negotiating with the Alberta lands and mines department for development rights in the bituminous sand area.

Ontario Drilling

In Chatham Township, Kent County, Ontario, Union Gas Co. No. 3, SW Lot 6, Concession 14, is more than 775 feet in the Trenton below 3,550 feet. Traces of gas were struck at 3,230 feet but no other shows. It will be continued to the granite.

In Raleigh Township, Kent County, Ajax Oil & Gas Co. is drilling the fourth of a series of structure tests in Concession 13. Farther south and west, F. W. Burchell No. 1, E half Lot 151, Talbot Road, is shut down.

In the Eden field, Lambton County, Olga Gas No. 3 C. A. Wilson farm, Lot 24, Concession 8, Bayham Township, is below 550 feet.

Central West Fields

(Continued from Page 136)

farm produced 50 bbls. initially, and No. 6 on the same farm produced 55 bbls. J. C. Miller No. 1 William Short is a dry hole, but the same operators No. 1 Crow tract produced 75 bbls. Hupp, Duff & Co. No. 1 Candy Graham produced an initial of 85 bbls. Gabbert Interests No. 1 John Brown was a dry hole, and Walter Sargents No. 3 Taylor tract was dry.

INDIANA FIELD

Indiana field holds up in activity, and while the wells are not large, the summary makes a fairly good showing. In Daviess County, Oliphant & Sage No. 1 on the Paul Fuhrman farm, SW NE section 34, Barr Township, is a gas well at a depth of 597 feet. Same parties are drilling No. 1 on the George W. Price farm, section 34, same township. Midwest Development Corp. No. 1 on the Mary Boyles farm, section 33, same township, was dry at 702 feet.

In Knox County, O. A. Thayer No. 1 on the Myrtle Cowles farm, location 290, was a dry hole at 845 feet. Phillips Petroleum Co. No. 2 is drilling No. 2 J. A. Andrews farm, section 14.

In Huntington County, Charles Wiley is drilling No. 4 on the E. Lentz farm, section 18, Salamonia Township.

In Perry County, Haney & Hollingsworth No. 1 on the James Hauser estate, is a dry hole at 660 feet. Nollem Oil & Gas Corp. No. 1 on the Martha Hennin estate, section 8, is a gas well at 491 feet. A. B. Bement No. 3 on the Henry Hardwick farm, section 24, Clark Township, is a gas well at a depth of 150 feet. Haney & Hollingsworth No. 1 on the Knable estate, section 17, Troy Township, same county, was a failure.

In Pike County, Murphy Oil Co. is drilling No. 1 Waltz farm, section 33, Clay Township.

In Vanderburg County, John L. Drake is drilling No. 3, A. E. Swope, section 33, Center Township, Evans Oil & Gas Co. is drilling No. 1 Oscar Birch, section 30, and Oliphant & Sage are drilling No. 1 on the H. Boeke, section 31, same township.

Gulf Coast Water Shipments—March, 1936

Company, terminal—	Crude		Refined		Total
	Coastwise	Exports	Coastwise	Exports	
Atlantic P. L. Co.:					
Atreco	1,846,317.92	109,534.08	.....	.....	1,955,852.00
Texas City	364,536.37	.....	8,538.39	.....	373,074.76
Harbor Island	837,046.75	.....	.....	.....	837,046.75
Gulf Oil Corp.:					
Port Arthur	522,608.64	.....	3,377,688.41	78,025.80	3,978,322.85
Humble Oil & Ref. Co.:					
Baytown	187,908.69	.....	3,455,143.41	398,339.47	4,041,391.57
Harbor Island	1,740,762.55	42,307.31	.....	.....	1,783,069.86
Texas City	361,447.79	.....	.....	.....	361,447.79
Ingleside	32,211.94	.....	.....	.....	32,211.94
Magnolia Pet. Co.*					
Beaumont	812,684.36	.....	2,923,740.14	.....	3,736,424.50
Pure Oil Co.:					
Smiths Bluff	427,592.00	.....	928,177.00	.....	1,355,769.00
Shell Pet. Corp.:					
Houston	197,054.00	.....	1,167,069.00	149,159.00	1,513,282.00
Norco	.....	.....	366,364.00	.....	366,364.00
Standard Oil Co. of La.:					
Baton Rouge	254,836.00	78,443.00	1,300,896.00	96,776.00	1,730,950.00
Sun Pipe Line Co.:					
Sabine Pass and Sun.	1,294,896.45	.....	.....	.....	1,294,896.45
Texas Co.:					
Port Arthur	1,322,151.00	371,348.00	2,424,586.00	791,625.00	4,909,710.00
Miscellaneous	1,265,920.81	.....	1,346,359.49	799.27	2,613,079.57
Total March, 1936.	11,467,974.27	601,632.39	17,298,561.84	1,514,724.54	30,882,893.04
Total Feb., 1936	11,377,279.72	963,692.22	17,896,553.40	2,424,661.43	32,662,086.77
Difference	90,694.55	361,959.83	597,991.56	909,936.89	1,779,193.73

*No distinction made between coastwise and export shipments.

WILDCAT OPERATIONS

CALIFORNIA

IMPORTANT WELLS AND NORTHERN CALIFORNIA WILDCATS

Company, well and location—	S. T. R.	Depth	Status—
Shell Oil Co., No. 11 Capitan, Santa Barbara Co.	32- 5-30	2,789	pump. water
Shell Oil Co., No. 12 Capitan, Santa Barbara Co.	32- 5-30	2,600	pump. 45 b.d.
Shell Oil Co., No. 13 Capitan, Santa Barbara Co.	32- 5-30	1,755	sd. sh. drlg.
Shell Oil Co., No. 14 Capitan, Santa Barbara Co.	32- 5-30	1,721	sd. sh. drlg.
Shell Oil Co., No. 15 Capitan, Santa Barbara Co.	32- 5-30	....	bldg. rig
La Canada Oil Co., No. 1 Capitan, Santa Barbara Co.	33- 5-30	....	bldg. rig
Honolulu Oil Corp., No. 9 Elwood, Santa Barbara Co.	tideland	6,705	to acidize
Barnsdall-Rio Grande, No. 9 Elwood, Santa Barbara	tideland	3,755	flow. 1,870 b.d.
Barnsdall-Rio Grande, No. 12 Elwood, Santa Barbara Co.	tideland	8,506	fish. D.P.
York Oil Co., No. 3 Lompoc, Santa Barbara Co.	33- 8-34	....	rigging up
Union Oil Co., No. 16 Orcutt, Santa Barbara Co.	26- 9-34	3,551	sd. sh. drlg.
Moore, Inc., No. 1 Santa Maria, Santa Barbara Co.	35-10-35	3,035	resume work
Santa Barbara Oil Co., No. 1 Carpinteria, S. Barbara	29- 4-25	2,290	cleaning out
Cornero, Tony, No. 1 Carpinteria, Santa Barbara Co.	8- 4-25	1,025	dry, abd.
Bankline Oil Co., No. 1 Coal Oil Pt., Santa Barbara Co.	tideland	6,510	redrlg. 700
Anacapa Oil Co., No. 4 Mesa, Santa Barbara Co.	28- 4-27	1,630	sd. sh. drlg.
Calco Pet. Co., No. 1 Las Posas, Ventura Co.	17- 3-20	3,210	reaming
Union Oil Co., No. 10 Bardsdale, Ventura Co.	12- 3-20	6,055	cleaning out
Pet. Securities Co., No. 1 Bardsdale, Ventura Co.	7- 3-19	4,490	gr. sd. drlg.
Calkan Pet. Co., No. 1 Sespe, Ventura Co.	23- 5-20	510	sd. sh. drlg.
Condor Oil Co., No. 1 Sespe, Ventura Co.	6- 4-19	1,180	hd. sh. drlg.
Wasibi Oil Co., No. 1 Sespe, Ventura Co.	33- 5-19	....	rigged up
Laing & Jacobs, No. 1 Shiells Canyon, Ventura Co.	32- 4-19	1,275	cleaning out
Bestco Pet. Co., No. 1 Shiells Canyon, Ventura Co.	2- 3-19	2,655	hd. sd. drlg.
Bankline Oil Co., No. 1 Shiells Canyon, Ventura Co.	3- 3-19	4,475	rd. sh. drlg.
Petroleum Securities, No. 1 Shiells Canyon, Ventura Co.	3- 3-19	3,285	hd. sh. drlg.
The Texas Co., No. 129 Shiells Canyon, Ventura Co.	4- 3-19	4,812	P.B. 4,260
The Texas Co., No. 130 Shiells Canyon, Ventura Co.	4- 3-19	1,360	sd. sh. drlg.
The Texas Co., No. 131 Shiells Canyon, Ventura Co.	4- 3-19	....	rigging up
Hull, James, No. 1 Santa Susana, Ventura Co.	2- 2-18	1,791	recmtd. 500
Bolsa Chica Oil Co., No. 3 Temescal, Ventura Co.	4- 4-18	2,131	br. sh. drlg.
Bolsa Chica Oil Co., No. 4 Temescal, Ventura Co.	4- 4-18	....	rigging up
Johnson, R. P., No. 1 Temescal, Ventura Co.	21- 4-18	1,673	P.B. 1,300
General Pet. Corp., No. 2 Oxnard, Ventura Co.	26- 2-22	6,686	sd. sh. drlg.
Rincon Oil Co., No. 3 Rincon, Ventura Co.	tideland	2,193	cleaning out
Continental Oil Co., No. 5 San Miguelito, Ventura Co.	24- 3-24	2,996	sd. sh. drlg.
C. C. M. Oil Co., No. 1 Javon, Ventura Co.	15- 3-24	....	rigging up
Standard Oil Co., No. 1 Lost Hills, Kern Co.	2-26-20	6,335	to deepen
Associated Oil Co., No. 2 Lost Hills, Kern Co.	2-26-20	....	bldg. rig
Richfield Oil Co., No. 2 Devil's Den, Kern Co.	14-25-18	2,864	sd. sh. drlg.
East Puente Oil Co., No. 21 McKittrick, Kern Co.	11-30-21	....	bldg. rig
Calcrude Pet. Co., No. 1 McKittrick, Kern Co.	34-30-22	1,010	sd. sh. drlg.
Welport Oil Co., No. 14 McKittrick, Kern Co.	26-29-21	1,501	hd. sd. drlg.
Standard Oil Co., No. 4 North Belridge, Kern Co.	36-27-20	7,140	br. sh. drlg.
Associated Oil Co., No. 5 North Belridge, Kern Co.	34-27-20	5,879	redrlg. 5,880
Belridge Oil Co., No. 18-35 North Belridge, Kern Co.	35-27-20	5,383	cmtd. 5,351
Belridge Oil Co., No. 17-35 North Belridge, Kern Co.	35-27-20	6,766	sd. sh. drlg.
Union Oil Co., No. 20 North Belridge, Kern Co.	36-27-20	9,492	P.B. 9,340
Union Oil Co., No. 21 North Belridge, Kern Co.	36-27-20	6,502	br. sh. drlg.
Continental Oil Co., No. 7 North Belridge, Kern Co.	36-27-20	7,996	cmtd. 7,985
C. C. M. Oil Co., No. 17 Kern Front, Kern Co.	23-28-27	2,240	pump. 163 b.d.
C. C. M. Oil Co., No. 18 Kern Front, Kern Co.	23-28-27	1,181	sd. sh. drlg.
C. C. M. Oil Co., No. 19 Kern Front, Kern Co.	23-28-27	....	rigging up
Republic Pet. Co., No. 10 Kern Front, Kern Co.	24-28-27	2,095	pump. 240 b.d.
Republic Pet. Co., No. 11 Kern Front, Kern Co.	11-28-27	....	rigging up
Republic Pet. Co., No. 12 Kern Front, Kern Co.	24-28-27	....	bldg. rig
Elbe Pet. Co., No. 1 Kern Front, Kern Co.	13-28-27	2,075	dry, abd.
Vega Oil Co., No. 1 Kern Front, Kern Co.	11-28-27	1,497	sd. sh. drlg.
National Oil Co., No. 5 Kern Front, Kern Co.	1-28-27	1,886	sd. sh .drlg.
National Oil Co., No. 6 Kern Front, Kern Co.	11-28-27	....	rigging up
General Pet. Corp., No. 6 Kern Front, Kern Co.	14-28-27	....	rigging up
General Pet. Corp., No. 7 Kern Front, Kern Co.	14-28-27	....	bldg. rig
Kern River Oilfields, No. 8 Kern Front, Kern Co.	25-28-27	....	bldg. rig
Associated Oil Co., No. 7 Kern Front, Kern Co.	23-28-27	....	rigging up
Standard Oil Co., No. 12 Kern Front, Kern Co.	9-29-27	2,850	pump. 178 b.d.
Standard Oil Co., No. 14 Kern Front, Kern Co.	15-28-27	1,760	sd. sh. drlg.
The Texas Co., No. 16 Kern Front, Kern Co.	23-28-27	1,864	sd. sh. drlg.
Union Oil Co., No. 8 Kern Front, Kern Co.	11-28-27	1,692	cmtd. 1,643
American Expl. Co., No. 1 Kern Front, Kern Co.	16-28-27	1,672	sd. sh. drlg.
Ausbrit Oil Co., No. 1 Premier, Kern Co.	20-27-27	2,139	cmtd. 2,139
Unger, M., No. 1 Dominion, Kern Co.	27-26-28	1,454	sd. sh. drlg.
McMahan, Hugh, No. 1 Mount Poso, Kern Co.	27-26-28	1,537	cleaning out
Union Oil Co., No. 11 Mount Poso Tribe, Kern Co.	28-27-28	....	bldg. rig
Cal-Coast-Apex Oil Co., No. 1 Mount Poso, Kern Co.	36-26-27	1,176	sd. sh. drlg.
General Pet. Corp., No. 13 Mount Poso, Kern Co.	16-27-28	....	rigging up
General Pet. Corp., No. 14 Mount Poso, Kern Co.	16-27-28	....	bldg. rig
Santa Anita Oil Co., No. 1 Mount Poso, Kern Co.	11-27-27	1,296	sd. sh. drlg.
Tilton & Harp, No. 1 Mount Poso, Kern Co.	6-27-28	951	sd. sh. drlg.
Union Oil Co., No. 1 Poso Outpost, Kern Co.	34-27-28	2,140	sd. sh. drlg.
Woods & Bailey, No. 1 McFarland, Kern Co.	16-26-26	3,640	sd. sh. drlg.
Dixie Lee Oil Co., No. 2 Fruitvale, Kern Co.	23-29-27	3,204	flow. 130 b.d.
Connelly, T. E., No. 1 Fruitvale, Kern Co.	21-29-27	4,154	sd. sh. drlg.
Mosebach Oil Co., No. 1 Fruitvale, Kern Co.	21-29-27	3,097	sd. sh. drlg.
Trico Oil & Gas Co., No. 1 Fruitvale, Kern Co.	23-29-27	1,071	sd. sh. drlg.
Magnet Oil Co., No. 1 Fruitvale, Kern Co.	21-29-27	4,069	cleaning out
Western Gulf Oil Co., No. 23 Fruitvale, Kern Co.	27-29-27	3,550	gr. sd. drlg.
Western Gulf Oil Co., No. 25 Fruitvale, Kern Co.	27-29-27	3,460	recmtd. 3,382
Nydia Pet. Co., No. 1 Fruitvale, Kern Co.	26-29-27	....	bldg. rig
Hogan Pet. Co., No. 12 Mountain View, Kern Co.	32-30-29	6,049	flow. 1,270 b.d.
Hogan Pet. Co., No. 13 Mountain View, Kern Co.	32-30-29	6,005	cmtd. 5,685
Hogan Pet. Co., No. 14 Mountain View, Kern Co.	32-30-29	4,960	sd. sh. drlg.
Hogan Pet. Co., No. 15 Mountain View, Kern Co.	4-31-29	....	rigging up
Buffalo Oil Co., No. 3 Mountain View, Kern Co.	19-30-29	1,892	sd. sh. drlg.
Petrol Prod. Co., No. 1 Mountain View, Kern Co.	32-30-29	....	bldg. rig
Mohawk Oil Co., No. 16 Mountain View, Kern Co.	30-30-29	6,074	cleaning out
Mohawk Oil Co., No. 18 Mountain View, Kern Co.	30-30-29	5,985	rig to pump
Mohawk Oil Co., No. 19 Mountain View, Kern Co.	30-30-29	....	rigging up
Allied Pet. Corp., No. 1 Mountain View, Kern Co.	19-30-29	5,168	fish. swab
Treasure Oil Co., No. 1 Mountain View, Kern Co.	12-30-28	1,765	sd. sh. drlg.
Jergins Trust, No. 8 Mountain View, Kern Co.	19-30-29	3,140	sd. sh. drlg.
Shell Oil Co., No. 9 Mountain View, Kern Co.	32-30-29	5,996	rig to pump
Shell Oil Co., No. 10 Mountain View, Kern Co.	32-30-29	5,990	rig to pump
Shell Oil Co., No. 11 Mountain View, Kern Co.	32-30-29	2,884	sd. sh. drlg.
Vesta Pet. Co., No. 10 Mountain View, Kern Co.	19-30-29	....	rigging up
Standard Oil Co., No. 26 Mountain View, Kern Co.	13-30-28	5,064	P.B. 5,049
Mohawk Pet. Co., No. 1 Arvin, Kern Co.	10-31-29	....	rigging up
R. & R. Dev. Co., No. 1 Arvin, Kern Co.	32-30-30	704	granite drlg.
Ohio Oil Co., No. 1 Rio Bravo, Kern Co.	1-30-25	7,440	sd. sh. drlg.
Shell Oil Co., No. 1 Stevens, Kern Co.	29-30-26	7,888	reaming 7,290
Round Mountain Oil Co., No. 2 Round Mountain, Kern	19-28-29	1,913	cleaning out
Shell Oil Co., No. 4 Round Mountain, Kern Co.	7-28-29	1,955	rig to pump
Shell Oil Co., No. 5 Round Mountain, Kern Co.	7-28-29	1,548	pump. 460 b.d.
Shell Oil Co., No. 6 Round Mountain, Kern Co.	7-28-29	1,594	O.S. drlg.
Shell Oil Co., No. 7 Round Mountain, Kern Co.	7-28-29	1,702	cmtd. 1,692
Shell Oil Co., No. 8 Round Mountain, Kern Co.	7-28-29	....	rigging up
Shell Oil Co., No. 9 Round Mountain, Kern Co.	7-28-29	....	bldg. rig
Honolulu Oil Corp., No. 17 Round Mountain, Kern Co.	18-28-29	2,106	bailing
Honolulu Oil Corp., No. 18 Round Mountain, Kern Co.	18-28-29	1,060	sd. sh. drlg.
Honolulu Oil Corp., No. 19 Round Mountain, Kern Co.	20-28-29	....	bldg. rig
Jergins Trust, No. 20 Edison, Kern Co.	13-30-29	1,380	sd. sh. drlg.
Jergins Trust, No. 22 Edison, Kern Co.	22-30-29	4,395	P.B. 4,050
Jergins Trust, No. 23 Edison, Kern Co.	23-30-29	3,287	dry, abd.
Buffalo Oil Co., No. 2 Edison, Kern Co.	24-30-29	1,181	cleaning out
Wood-Callahan Oil Co., No. 1 Edison, Kern Co.	23-30-29	....	bld. rig
Higgins, W. F., No. 1 Edison, Kern Co.	17-30-29	1,120	sd. sh. drlg.
General Pet., No. 15 Edison, Kern Co.	11-30-29	....	rigging up
General Pet., No. 16 Edison, Kern Co.	10-30-29	1,855	cleaning out
General Pet., No. 17 Edison, Kern Co.	21-30-29	3,200	cmtd. 2,950
Pioneer Holding Co., No. 2 Edison, Kern Co.	17-30-30	1,161	sd. sh. drlg.
General Pet. Corp., No. 1 Elk Hills, Kern Co.	5-30-24	6,149	P.B. 5,465
Bender, E. A., No. 1 San Emidio, Kern Co.	14-10-23	488	sd. sh. drlg.
C. C. M. Oil Co., No. 28 Midway, Kern Co.	28-32-23	....	bldg. rig
Gibson Oil Co., No. 3 Maricopa, Kern Co.	6-11-23	3,315	dry, abd.
Gibson Oil Co., No. 5 Maricopa, Kern Co.	8-11-23	....	rigging up
Gibson Oil Co., No. 6 Maricopa, Kern Co.	6-11-23	....	bldg. rig
Chief Oil Co., No. 2 Maricopa, Kern Co.	6-11-23	2,665	pump. 240 b.d.
General Pet. Corp., No. 61 Maricopa, Kern Co.	24-31-23	1,032	sd. sh. drlg.
General Pet. Corp., No. 2 Maricopa, Kern Co.	6-11-23	....	bldg. rig
Shell Oil Co., No. 1 Maricopa, Kern Co.	7-11-23	2,794	sd. sh. drlg.
Hoyt, Otis, No. 1 Maricopa, Kern Co.	7-11-23	980	sd. sh. drlg.
Standard Oil Co., No. 24 Midway-Sunset, Kern Co.	36-12-24	2,724	pump. 360 b.d.
Standard Oil Co., No. 25 Midway-Sunset, Kern Co.	36-12-24	2,106	redrlg. 1,995
Standard Oil Co., No. 30 Midway-Sunset, Kern Co.	31-12-23	2,070	sd. sh. drlg.
Standard Oil Co., No. 65 Midway-Sunset, Kern Co.	36-12-24	2,160	rig to pump
Standard Oil Co., No. 54 Midway-Sunset, Kern Co.	33-32-24	3,138	pump. 451 b.d.
Standard Oil Co., No. 4 Midway-Sunset, Kern Co.	5-11-23	2,584	sd. sh. drlg.
Standard Oil Co., No. 219 Midway-Sunset, Kern Co.	33-32-24	....	bldg. rig
Quality Oil Co., No. 2 Midway-Sunset, Kern Co.	22-32-23	1,972	sd. sh. drlg.
Santa Cerritos Oil Co., No. 1 Midway-Sunset, Kern Co.	23-32-23	....	rigging up
Berry Holding Co., No. 23 Midway-Sunset, Kern Co.	34-12-24	921	sd. sh. drlg.
Alford Oil Co., No. 5 Midway-Sunset, Kern Co.	4-32-23	2,630	sd. sh. drlg.
Fairfield, F. E., No. 1 Midway-Sunset, Kern Co.	23-32-23	....	bldg. rig
McAdams, Ed., No. 1 Midway-Sunset, Kern Co.	23-32-23	2,000	dry, abd.
Obispo Oil Co., No. 12 Midway-Sunset, Kern Co.	32-12-23	1,951	cmtd.
Jerman, R. W., No. 1 Midway-Sunset, Kern Co.	31-12-23	4,128	P.B. 3,521
Ohio Oil Co., No. 7 Buena Vista Lake, Kern Co.	5-32-26	....	bldg. rig
Ohio Oil Co., No. 1 Tejon, Kern Co.	36-11-19	606	sd. sh. drlg.
Reserve Oil & Gas Co., No. 1 Tejon, Kern Co.	33-11-19	6,032	little gas
Signal Oil Co., No. 1 Comanche, Kern Co.	30-32-30	520	dry, abd.

KEY TO ABBREVIATIONS USED IN DRILLING REPORTS

Abd., abandoned.
Bldg., building.
B.D., barrels daily.
B.P., back pressure.
B.R., building rig.
Br. sh., brown shale.
B.S., basic sediment.
C.P., casing pressure.
Cd. or Crd., cored.
C.D., corrected depth.
Cg., coring.
C.L., center line.
Cmtd., cemented.
C.O., cleaning out.
Comp., completed.
Compr., compressor.
C.P., casing pressure, also cement through perforations.
Csg., casing.
D.D., drilling (or drilled) deeper.
Drlg., or Drg., drilling.
Drk. or Dk., derrick.
D.S., drill stem.
D.&A., dry and abandoned.
Fsg., fishing.
Gbo., gumbo.
G.I., gas injection.
Gr., gravity.
Gr. sd., gray sand.
Grn. sh., green shale.
Hd. sd., hard sand.
H.F.W., hole full of water.
I.P., initial production.
L., lime.
L.D.D., later drilled deeper.
Lnr., liner.
Loc., location.
M.I.M., moving in material.
M.I.R., moving in rig.
M.I.R.T., moving in rotary tools.
M.O.T., milling on tools.
O.I.H., oil in hole.
O.S., oil sand.
O.T.D., old total depth.
O.W.D.D., old well drilling deeper.
O.W.P.B., old well plugging back.
P.B., plugging or plugged back.
P.B.P., pulling big pipe.
P.L., pipe line.
P.L.O., pipe line oil.
Pmpg., pumping.
P.O.P., putting on pump.
P.P., pulled pipe.
Rd. sd., red sand.
Rd. sh., red shale.
Recmt., recemented.
Rmg., reaming.
Redrlg., redrilling.
Rng., running.
R.O.G., rig on ground.
R.P., rock pressure.
R.U., rigging up.
R.U.R., rigging up rotary.
R.U.R.T., rigging up rotary tools.
R.U.S.T., rigging up standard tools.
R.&T., rods and tubing.
S. or Sd., sand.
S.D., shut down.
Sd. sh., sandy shale.
Sdtr. or St., sidetracking.
S.D.P.L., shut down for pipe line.
S.D.W.O., shut down awaiting orders.
S.G., show gas.
Sh.&L., shale and lime.
S.I., shut in.
S.I.P., shut in, prorated.
S.L.M., steel line measurement.
S.O., show oil.
S.O.G.&W., show of oil, gas and water.
Spdg. or Spd., spudding.
S.R., straightreaming.
Stdg., standardizing (also standing).
S.W., salt water.
Swbg., swabbing.
T.A., temporarily abandoned.
Tbg., tubing.
T.D., total depth.
T.P., tubing pressure.
Tr., tract.
U.R., underreaming.
W.I.H., water in hole.
W.O., workover.
W.O.C. or W.O.C.S., waiting on cement to set.
W.P., working pressure.
W.S.O., water shutoff.
W.S.O.O.K., water shut-off O.K.
W.S.O.N.G., water shutoff no good.
W.S.R. or W.O.S.R., wait on standard rig.
Wtr., water.

Tejon Ridge Oil Co., No. 1 Comanche, Kern Co.	23-32-29	2,397	cleaning out
Seaboard Oil Co., No. 4 Huron, Fresno Co.	10-16-13	4,455	dry, abd.
Western Gulf, No. 3 Cantua, Fresno Co.	3-17-15	5,375	hd. sd. drlg.
Conlon, J. M., No. 1 Coalinga, Fresno Co.	30-19-15	1,120	sd. sh. drlg.
Standard Oil Co., No. 1 South Coalinga, Fresno Co. ..	36-21-14	1,560	sd. sh. drlg.
Union Oil Co., No. 1 Lillis-Welsh, Fresno Co.	24-21-16	11,127	P.B. 10,729
K. N. D. A., No. 2 Kettleman North, Fresno Co.	20-21-17	8,086	br. sh. drlg.
K. N. D. A., No. 33 Kettleman North, Fresno Co.	13-21-17	....	rigging up
K. N. D. A., No. 74 Kettleman North, Fresno Co.	30-21-17	6,740	br. sh. drlg.
K. N. D. A., No. 81 Kettleman North, Fresno Co.	24-21-16	....	bldg. rig
K. N. D. A., No. 36 Kettleman North, Kings Co.	36-22-18	9,732	P.B. 9,065
Standard Oil Co., No. 25 Kettleman North, Fresno Co.	19-21-17	6,171	hd. sh. drlg.
Standard Oil Co., No. 43 Kettleman North, Fresno Co.	19-21-17	906	sd. sh. drlg.
Standard Oil Co., No. 56 Kettleman North, Fresno Co.	19-21-17	5,210	sd. sh. drlg.
Standard Oil Co., No. 65 Kettleman North, Fresno Co.	19-21-17	7,102	br. sh. drlg.
Standard Oil Co., No. 72 Kettleman North, Fresno Co.	19-21-17	7,020	br. sh. drlg.
Standard Oil Co., No. 2 Kettleman Middle, Kings Co..	29-22-19	8,828	gr. sd. drlg.
Kettleman View Oil Co., well No. 1, Kings Co.	29-22-19	1,629	recmt. 1,451
Commonwealth Con. Gas Co., No. 2 Tulare Lake, Kings	21-22-20	2,495	hd. sh. drlg.
Pismo Pet. Corp., No. 2 Pismo, San Luis Obispo Co. ..	5-32-13	....	bldg. rig
Emerich Oil Co., No. 1 Cholame, San Luis Obispo Co..	22-32-22	3,135	dry, abd.
Taft Well Drlg. Co., No. 1 Pismo, San Luis Obispo Co.	31-31-13	3,475	deepening
Martin, J. D., No. 4 Pismo, San Luis Obispo Co.	5-32-13	2,230	sd. sh. drlg.
Martin, J. D., No. 5 Pismo, San Luis Obispo Co.	5-32-13	1,990	sd. sh. drlg.
Birch-Royer Oil Co., No. 1 Pismo, San Luis Obispo Co.	33-31-13	1,601	sd. sh. drlg.
Jergins Trust, No. 1 Pismo, San Luis Obispo Co.	5-32-13	....	bldg. rig
Barnsdall Oil Co., No. 1 Carissa Plains, S. Luis Obispo	24-28-17	3,475	sd. sh. drlg.
Bacon, E. D., No. 1 Carissa Plains, San Luis Obispo Co	22-31-31	140	sd. sh. drlg.
Burch, I. L., No. 1 Cuyama, San Luis Obispo Co.	4-10-26	120	sd. sh. drlg.
Holly Dev. Co., No. 1 Tracy, San Joaquin Co.	16- 2- 5	4,152	sd. sh. drlg.
Standard Oil Co., No. 1 McDonald Island, San Joaquin	25- 2- 4	4,997	sd. sh. drlg.
Pure Oil Co., No. 3 Chowchilla, Madera Co.	17-10-14	....	bldg. rig
Northern Counties Pet., No. 1 Tehama, Tehama Co. ..	25-24- 3	7,121	sd. sh. drlg.
Shell Oil Co., No. 1 Branch, Monterey Co.	34-24-10	8,562	sd. sh. drlg.
Hillman & Anderson, No. 1 Parkfield, Monterey Co. ..	15-24-14	....	bldg. rig
The Texas Co., No. 2 Eureka, Humboldt Co.	22- 3- 1	4,357	fish. D.P.
Amerada Pet. Co., No. 1 Emigh, Solano Co.	26- 4- 2	2,750	sd. sh. drlg.

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S. T. R.	Depth	Status—
Republic Pet. Co., No. 2 El Segundo, Los Angeles Co..	18- 3-14	7,477	C.P. 7,403
Marvin, J. L., No. 1 El Segundo, Los Angeles Co.	7- 3-14	7,340	sd. sh. drlg.
Signal Finance, No. 1 Hawthorne, Los Angeles Co. ...	19- 3-14	3,841	rigging up
Shell Oil Co., No. 1 Monets, Los Angeles Co.	33- 3-14	7,352	P.B. 4,140
Brown, R. A., No. 1 Torrance, Los Angeles Co.	31- 3-14	700	fish. D.P.
White Five Oil Co., No. 1 Torrance, Los Angeles Co...	31- 3-14	3,885	cleaning out
White Five Oil Co., No. 2 Torrance, Los Angeles Co...	31- 3-14	....	material
Walsh Co., No. 1 Torrance, Los Angeles Co.	31- 3-14	....	bldg. rig
Linderman, G. K., No. 2 Torrance, Los Angeles Co. ..	31- 3-14	....	rigging up
Regent Oil Co., No. 1 Torrance, Los Angeles Co.	6- 4-14	2,641	sd. sh. drlg.
Sterling Oil Co., No. 1 Torrance, Los Angeles Co.	31- 3-14	3,877	will P.B.
Roach, W. C., No. 1 Torrance, Los Angeles Co.	31- 3-14	3,130	cmtd. 3,125
Walken Oil Co., No. 1 Torrance, Los Angeles Co.	5- 4-14	3,200	sd. sh. drlg.
Dumas-Brown Oil Co., No. 1 Torrance, Los Angeles Co.	6- 4-14	1,196	sd. sh. drlg.
Dumas-Lewis Oil Co., No. 2 Torrance, Los Angeles Co.	6- 4-14	....	rigging up
B. & N. Oil Co., No. 1 Torrance, Los Angeles Co.	18- 4-14	3,369	cleaning out
Langstaff Pet. Corp., No. 1 Torrance, Los Angeles Co..	31- 3-14	....	rigging up
Lawler Pet. Co., No .1 Torrance, Los Angeles Co.	31- 3-14	1,164	sd. sh. drlg.
Macvan Oil Co., No. 1 Torrance, Los Angeles Co.	31- 3-14	2,780	sd. sh. drlg.
Redondo Oil Corp., No. 1 Torrance, Los Angeles Co....	31- 3-14	2,960	sd. sh. drlg.
Petrol Corp., No. 1 Torrance, Los Angeles Co.	31- 3-14	3,552	cleaning out
Tu-Jax Oil Co., No. 1 Torrance, Los Angeles Co.	32- 3-14	3,198	sd. sh. drlg.
Continental Royalties, No. 1 Torrance, Los Angeles Co.	32- 3-14	....	rigging up
Rennek Oil & Gas Co., No. 1 Torrance, Los Angeles Co.	5- 4-14	3,443	pump. 150 b.d.
Rennek Oil & Gas Co., No. 2 Torrance, Los Angeles Co.	5- 4-14	1,120	sd. sh. drlg.
C. C. M. Oil Co., No. 23 Torrance, Los Angeles Co....	8- 4-14	5,050	cmt. fish
West American Oil Co., No. 1 Dominguez, Los Angeles .	3- 4-13	3,358	reaming
Crude Oil Drlg. Co., No. 1 Gardena, Los Angeles Co...	31- 3-13	....	bldg. rig
Union Oil Co., No. 8 Domingues Carson, Los Angeles.	33- 3-13	6,450	sd. sh. drlg.
Barnsdall Oil Co., No. 15 Rosecrans, Los Angeles Co..	18- 3-13	4,955	redrlg. 3,961
Mars Oil Co., No. 1 Athens, Los Angeles Co.	7- 3-18	3,968	milling
Associated Oil Co., No. 18 Seal Beach, Los Angeles Co.	11- 5-12	5,491	sd. sh. drlg.
Continental Oil Co., No., 39 Seal Beach, Los Angeles	3- 5-12	....	bldg. rig
Standard Oil Cc., No. 27 Seal Beach, Los Angeles Co..	3- 5-12	5,875	sd. sh. drlg.
Eastern Oil Co., No. 1 Del Rey, Los Angeles Co.	32- 2-15	7,339	heavy gas
Deuel, W. E., No. 1 Del Rey, Los Angeles Co.	27- 2-15	....	bldg. rig
Union Oil Co., No. 21 Del Rey, Los Angeles Co.	27- 2-15	6,078	flow. 255 b.d.
Union Oil Co., No. 22 Del Rey, Los Angeles Co.	27- 2-15	3,130	sd. sh. drlg.
Yant Pet. Corp., No. 1 Newhall, Los Angeles Co.	1- 3-16	2,024	test. wet
Barnsdall Oil Co., No. 1 Newhall, Los Angeles Co. ...	34- 4-17	....	grade road
Jones & Co., No. 1 Newhall, Los Angeles Co.	36- 4-17	....	bldg. rig
Harbor Pet. Co., No. 1 Wilmington, Los Angeles Co. ..	28- 4-13	2,760	sd. sh. drlg.
Hull, James, No. 1 Wilmington, Los Angeles Co.	20- 4-13	....	bldg. rig
Sovereign Oil Co., No. 1 Wilmington, Los Angeles Co.	28- 4-13	3,535	pump. 160 b.d.
Codri Oil Co., No. 1 Wilmington, Los Angeles Co.	29- 4-13	3,568	cleaning out
General Pet. Corp., No. 1 Wilmington, Los Angeles Co.	4- 5-13	1,287	sd. drlg.
Monarch Oil Corp., No. 1 Topango, Los Angeles Co. ..	5- 1-16	1,486	sd. sh. drlg.
Standard Oil Co., No. 79 Montebello, Los Angeles Co...	2- 2-12	6,450	sd. sh. drlg.
Standard Oil Co., No. 81 Montebello, Los Angeles Co...	2- 2-12	3,876	blew out
Standard Oil Co., No. 82 Montebello, Los Angeles Co...	2- 2-12	7,721	sd. sh. drlg.
Standard Oil Co., No. 83 Montebello, Los Angeles Co...	2- 2-12	3,270	pump. 110 b.d.
Universal Consd., No. 6 Montebello, Los Angeles Co...	5- 2-11	5,571	cmtd. 5,380
Wilshire Oil Co., No. 1 Montebello, Los Angeles Co. ..	5- 2-11	6,352	redrlg. 5,940
Richfield Oil Co., No. 1 Montebello, Los Angeles Co. ..	5- 2-11	5,670	hd. sd. drlg.
Richfield Oil Co., No. 2 Montebello, Los Angeles Co. ..	5- 2-11	4,675	hd. sd. drlg.
North American, No. 2 Montebello, Los Angeles Co. ..	5- 2-11	5,526	hd. sd. drlg.
St. Helens Pet. Co., No. 7 Montebello, Los Angeles Co..	5- 2-11	3,594	hd. sh. drlg.
Oil & Gas Associates, No. 1 Pico, Los Angeles Co. ...	9- 2-11	4,281	repair mach.
McVicar & Rood, No. 1 San Jose Hills, Los Angeles Co.	6- 2- 9	731	sd. sh. drlg.
Great Coastal Oil Co., No. 1 Elsinore, Riverside Co. ..	36- 5- 5	3,266	hd. sd. drlg.
Commander Oil Co., No. 1 Newport, Orange Co.	29- 6-10	2,130	swab. water
Terry, George, No. 1 Westminister, Orange Co.	17- 5-11	3,096	sd. sh. drlg.
Hillman & Long, No. 1 Westminister, Orange Co.	14- 5-11	7,701	reaming
West American Oil Co., No. 1 East Coyote, Orange Co.	24- 3-10	....	rigging up
Union Oil Co., No. 29 Chapman Richfield, Orange Co.	30- 3- 9	3,293	O.H. drlg.
Union Oil Co., No. 31 Chapman Richfield, Orange Co.	30- 3- 9	3,097	sd. sh. drlg.
Union Oil Co., No. 32 Chapman Richfield, Orange Co.	30- 3- 9	....	rigged up
Continental Oil Co., No. 1 Yorba, Orange Co.	21- 3- 9	4,756	P.B. 2,453
Tehama Pet. Co., No. 2 Kraemer, San Bernardino Co..	33- 2- 8	396	sd. sh. drlg.
Tehama Pet. Co., No. 3 Kraemer, San Bernardino Co..	3- 3- 8	280	sd. sh. drlg.
Tehama Pet. Co., No. 4 Kraemer, San Bernardino Co..	32- 2- 8	50	hd. sh. drlg.
Equitable Pet. Co., No. 1 Wildcat, San Bernardino Co..	11-10- 5	2,248	hd. sh. drlg.

KANSAS

Week Ending May 16. (Descriptions are East unless marked otherwise)

Barton County

Buchanan & Alexander No. 1 Langfeld NE NE SW sec. 14-20-11w. K.C. 3,021 ft.; T.D. 3,399 ft.; swb. 15 bbls. per hour for 5 hrs.

John Burton No. 1 Wendel, NE cor. sec. 13-19-11w. S.D. 63 ft.

Davison et al No. 1 Birzer, SW SE SW sec. 22-17-12w. Anhydrite 760 ft.; S.D. 2,495 ft.

Morgan & Flynn et al No. 1 Zimmer, SW SE SW sec. 30-19-14w. Siliceous 3,480 ft.; T.D. 3,593 ft.; D.&A.

Murphy & Morgan No. 1 Robinson, NE NE SW sec. 21-16-14w. Siliceous 3,450-92 ft.; T.D.; D.&A.

G. H. Rose and W. H. Lant No. 1 Redetzke, NE NW NW sec. 1-16-11w. R.U.

Rose Spring Drlg. Co. et al No. 1 Rick, SW cor. sec. 1-19-11w. R.U.R.

Roy Ramsey et al No. 1 Hunt, NW cor. sec 10-18-11w. Siliceous 3,382 ft.; T.D. 3,404 ft.; est. 25 bbls. oil per day. P.B. 3,402 ft.; acidized; no increase; P.B. 3,400 ft.

Schermerhorn Oil Co. No. 1 Hunter, NE cor. sec. 29-18-15w. K.C. 3,194 ft.; set 7-in. csg. 3,408 ft.

Simpson & Noble and Atlantic Oil Producing Co. No. 1 Hiss, C NW NE sec. 31-20-13w. Anhydrite 753 ft.; K.C. 2,205 ft.; T.D. 3,290 ft.; Pot. 969 bbls. oil; comp.

Torry & Feaster No. 1 Feist, NE NE SE sec. 29-18-11w. Siliceous lime 3,430-32½ ft.; T.D.; potential; pumped 346 bbls. oil in 18½ hrs.

Wakefield & Johnson No. 1 Bumm, SW SW NE sec. 22-19-12w. Anhydrite 665 ft.; S.D. 670 ft.

Butler County

Dalton et al No. 1 Miley, C SW NE sec. 17-27-5. R.U.

Ellis et al No. 1-A Pettit, SE SE NW sec. 21-28-6. Drlg. 1,725 ft.

McGinnis et al No. 1 Hinnen, NE NE SW sec. 18-24-4. Set 15-in. csg. 130 ft.

Rex & Morris No. 1 Olson, NW SW SE sec. 15-28-6. Spudding.

Sanford et al No. 1 Weaver Est., SE SE NE sec. 11-28-5. Drlg. 2,170 ft.

Cowley County

Baden Prod. Co. No. 1 Sparka, SE SW NW sec. 35-33-4. Drlg. 1,285 ft.

Benedum-Trees No. 1 Carson, SW SW NW sec. 8-30-4. Spudded.

Craft et al No. 1 Whitson, NE NE NE sec. 29-33-4. Drlg. 50 ft.

DeGenther Oil Co. No. 1 Holt, NW NW SE sec. 15-30-5. R.U.

W. M. McKnabb No. 1 Community, C NE NW sec. 14-34-3. R.U.

A. D. Morton et al No. 1 Roger, SE SE NE sec. 1-31-4. Spudded and S.D.

Roth & Fauret No. 1 Guthrie, NW cor Lot 14, sec. 20-33-3. H.F.W. 3,146 ft. P.B.

Cameron & Pulse No. 1 Simpson, C NE NW sec. 3-30-4. Spudded.

Wakefield et al No. 1 Daniels, SE SW SE sec. 3-30-3. Drlg. 1,090 ft.

Edwards County

Stanolind O. & G. Co. et al No. 1 Donovan, C SE SE sec. 14-26-18w. Anhydrite 1,167 ft.; K.C. 4,037 ft.; set 8-in. csg. 4,055 ft.

Ellis County

James Brouk et al No. 1 Jacoba, NW NW SE sec. 31-15-16w. Rig.

Empire O. & R. Co. No. 1 Herl, SE cor. sec. 22-15-19w. T.D. 440 ft.; C.O.

Bridgeport Machine Co. et al No. 1 Madden Est., NE NW NW sec. 26-15-18w. Anhydrite 1,150 ft.; C.O. 2,505 ft.

Brunson & Ewers-Simpson No. 1 Gross, NE NE SW sec. 29-14-17w. Anhydrite 1,110 ft.; Topeka 2,960 ft.; Oswald 2,244-46 ft.; U.R.

Harris & Haun et al No. 1 Schmeidler, SE SE SW sec. 3-13-17w. Drlg. 1,625 ft.

Jones Bros. & Carpenter et al No. 1 Solomon, SE SE SW sec. 28-11-19w. Anhydrite 1,408 ft.; U.R. 8-in. csg. at 2,393 ft.

Lario Oil & Gas et al No. 1 Walter, SE NE SW sec. 3-13-18w. Anhydrite 1,314 ft.; Topeka 3,060 ft.; T.D. 3,165 ft.; swbd. 43 bbls. oil in 2 hrs.

Muth et al No. 1 Penney, SW SW SE sec. 29-14-18w. M.I.M.

Tom Palmer No. 1 Schoenthaler, NE NE NW sec. 31-12-19w. Drlg. 3,110 ft.

Parrish & Denman No. 1 Walter, SE SW SE sec. 14-13-17w. Drlg. 355 ft.

Albec Oil Co. No. 1 Union Pacific, NE cor. sec. 9-13-20w. Set 12-in. csg. 150 ft.

Twin Drlg. Co. No. 1 Copeland, NE NE SW sec. 26-14-19w. S.D. 1,017 ft.

Wolf Creek Oil Co. et al No. 1 Polifka, SW SW NE sec. 24-13-18w. Cellar.

Yarnell & Carlson No. 1 Phillip, NW NW SE sec. 2-14-18w. Anhydrite 1,227 ft.; drlg. 2,760 ft.

Ellsworth County

Empire O. & R. Co. et al No. 1 Kroesch, NW NW SE sec. 33-17-9w. Siliceous 3,260-74 ft.; T.D.; H.F.W.; D.&A.

Finney County

Helmerich & Payne No. 1 Jones, C SE sec. 34-26-34w. Rig.

Lone Star State Drlg. Co. No. 1 Hamlin, SW SW NE sec. 31-24-34w. Set 6-in. csg. 2,413 ft.; R.U.S.T.

Graham County

Vickers Pet. Co. & Phillips Pet. Co. No. 1 Hutton, NE NE SE sec. 29-8-22w. Anhydrite 1,805 ft.; drlg. 2,835 ft.

Greenwood County

Hale & Reese No. 1 Needles, NE SE NW sec. 12-25-10. S.D. 285 ft.

Ward McGinnis No. 1 Dater, NW NW SW sec. 11-24-8. Drlg. 2,420 ft.

Ward McGinnis No. 1 Lampe, NW NE SW sec. 26-24-8. R.U.

Harper County

Marathon Oil Co. No. 1 Zellers, C SW NW sec. 17-35-8w. Wilcox sand 5,320 ft.; S.O. and gas, salty taste; T.D. 5,410 ft.; fsg.

Harvey County

Harburney Oil Co. No. 1 Schrag, NW NW SE sec. 24-22-3w. Fsg. 2,875 ft.

Haskell County

Helmerich & Payne et al No. 1 Larson, C SE sec. 28-28-33w. Rig.

Kuhn Brothers et al No. 1 Nilson, SW SW SE sec. 21-28-32w. R.U.R.

Kingman County

D. R. Lauck et al No. 1 Prather, C SE sec. 18-27-8w. R.U.R.

D. R. Lauck et al No. 1 Skilling, C E½ E½ SW sec. 33-27-8w. O.W.D.D.; drlg. 4,583 ft.

Oklahoma Oil Corp. et al No. 1 Reeves, NW cor. sec. 29-27-5w. R.U.

McPherson County

Empire Oil & Ref. Co. No. 1 Cunningham, SE cor. sec. 26-18-1w. Drlg. 3,290 ft.

T. C. Johnson, et al No. 1 A. R. Johnson, SW SW NW sec. 33-17-1w. Drlg. 310 ft.

Ness County

Continental Oil Co. No. 1 Thompson, C E½ E½ SW sec. 13-18-26w. Siliceous and S.O. 4,446-50 ft.; set 7-in. csg. 4,445 ft.

Reno County

Cheney et al No. 1 Moore, NE cor. sec. 14-26-8w. K.C. 3,308 ft.; drlg. 3,850 ft.

Dickey Oil Co. No. 1-A Shepherd, NE NE NW sec. 22-26-9w. Chat 3,870 ft.; wtr., 4,161 ft.; P.B. 4,156 ft.

Foraker et al No. 1 Hiett, SE SW NE sec. 34-24-4w. S.O. 3,874 ft.; H.F.W. 3,-935 ft.; S.D. 2,948 ft.

Graham et al No. 1 Miller, NE NE SE sec. 36-25-10w. Bldg. rig.

Miller et al No. 1 Detter, NE SE NW sec. 28-22-7w. Spudded and S.D.

Rose Spring Drlg. Co. No. 1 Swansen, NE NE NW sec. 1-23-5w. Rig.

Rice County

Beardmore et al No. 1 Fuller, SW SW SE sec. 33-18-7w. S.D. 3,100 ft.

Day No. 1 Mason, NW NE NE Sec. 33-21-7w. Chat 3,385-3,400 ft.; acidized; pumped 133 bbls. in 5 hrs.

Dickey Oil Co. and Continental Oil Co. No. 1 Newkirk, NE NE SW sec. 11-18-7w. Simpson 3,179 ft.; T.D. 3,256 ft.; cmtd. hole.

Duwe & Schneider No. 1 Wright, NE cor. sec. 36-21-7w. K.C. 2,925 ft. H.F.W. 3,-055 ft.; drlg. 3,130 ft.

Glimac Oil Co. No. 1 Sargent, SE cor. sec. 31-18-6w. Drlg. 1,125 ft.

Grattan et al No. 1 Williams, SW SW NW sec. 17-18-7w. K.C. L. 2,818 ft.; cg. 3,-202 ft.; H.F.W. 3,207 ft.; drlg. 3,345 ft.

Gulf Oil Corp. No. 1 Steckel, SW cor. sec. 30-19-10w. Set 10-in. csg. 150 ft.

Permian Oil Co. No. 1 Monroe, C NE NE sec. 9-20-7w. Set 10-in. csg. 2,114 ft.; S.D. 2,605 ft.

Sage et al No. 1 Patton, SW cor. sec. 5-21-7w. Rig.

Shell Pet. Corp. et al No. 1 Hafermann, C N½ N½ SE sec. 6-19-9w. Drlg. 474 ft.

Shell Pet. Corp. No. 1 Maughlin, NE NW SE sec. 11-20-8w. Drlg. 2,319 ft.

Simpson & Noble et al No. 1 Pulliam, C S½ N½ NE sec. 35-19-8w. Drlg. 2,410 ft.

Simpson & Noble and Stanolind O. & G. Co. No. 1 Bowman, SW SW NW sec. 22-19-10w. Rig.

Skiles et al No. 1 Stout, SE cor. sec. 6-21-9w. Drlg. 2,180 ft.

Rooks County

Hartman & Blair et al No. 1 Hall, NW cor. sec. 25-10-17w. Rigging up.

Helmerich & Payne et al No. 1 Bedard, C NE sec. 29-9-19w. Bldg. rig.

L. C. D. Drlg. Co., et al No. 1 Westhusin, C NE SE sec. 11-9-17w. Bldg. rig.

J. H. Lester No. 1 Methene, SE SE NE sec. 29-10-20w. S.D. 1,279 ft.

Murfin et al No. 1 Wasthusin, NE NE SE sec. 19-9-16w. Drlg. 2,805 ft.

J. A. Shoemake No. 1 Stebbins, NE NE SW sec. 26-7-17w. Loc.

Skaer Oil Corp. et al No. 1 Dryden, NE cor. sec. 28-10-17w. Drlg. 1,338 ft.

Trees Oil Co. No. 1 Minx, SW cor. sec. 31-10-18w. Location.

Rush County

Boyle & Grossman No. 1 Wilson, NE cor. sec. 33-17-19w. Drlg. 1,290 ft.

Ira Keith et al No. 1 Dartmouth Savings Bank, SW SW NE sec. 3-17-18w. Oswald 3,335 ft.; R.U.S.T. 3,346 ft.

National Refining Co. No. 1 Werth, NW NE NE sec. 7-16-18w. Anahydrite 1,-195 ft.; Oswald 3,328 ft.; drlg. 3,480 ft.

Pryor & Lockhart et al No. 1 Stegman, SW NW NE sec. 11-16-17w. Drlg. 910 ft.

Rose Spring Drlg. Co. et al No. 1 Jacobs, SW SE NW sec. 8-16-17w. Gas est. 1,-500,000 ft. at 3,560 ft.

Russell County

R. G. Berry et al No. 1 Cook, NE NE SE sec. 19-11-13w. Oswald 3,097 ft.; drlg. 3,390 ft.

Central Pet. Co. No. 1 Furthmeyer, NE cor. sec. 28-14-15w. Anhydrite 838 ft.; Oswald 3,023 ft.; U.R.

Darby Petroleum Corp. and Continental Oil Co. No. 1 Letsch, SE NE NW sec. 34-14-13w. Granite wash 3,238 ft.; granite 3,262-65 ft.; P.B.

Eisenhour & Shaffer No. 1 Humes, SW SW SW sec. 6-14-12w. Drlg. 3,137 ft.

Hartman & Blair No. 1 Johnston, NW cor. sec. 11-13-14w. R.U.

Hartman & Blair No. 1 McAllister, SW SW SE sec. 24-13-15w. Anhydrite 940 ft.; S.D. 1,130 ft.

Lario Oil & Gas Co. et al No. 1 Steinert, NE NE SW sec. 21-15-15w. M.I.M.

Stearns & Streeter et al No. 1 John Hancock Ins. Co., SE SW SW sec. 31-13-14w. Topeka 2,567 ft.; Oswald 2,845 ft.; U.R. 2,965 ft.

R. C. Tarrant No. 1 Williamson, SE SE NW sec. 9-14-14w.

Tarkio lime 2,515 ft.; T.D. 3,550 ft.; swbd. 5 bbls. oil per hr., and showing of wtr.; acidized with 1,000 gals.; made potential of 243 bbls. of oil.

P. G. Reynolds No. 1 Fredrickson, SE SW SE sec. 6-13-12w. Oswald 2,987 ft.; drlg. 3,130 ft.

Wakefield et al No. 1 Krug, NE NW SW sec. 7-15-14w. Drlg. 545 ft.

Saline County

James Brouk et al No. 1 Othelander, NE NW SE sec. 19-16-3w. Bldg. rig.

Sedgwick County

Joe Aylward et al No. 1 Harrison, SE SE SW sec. 22-25-2. Drlg. 50 ft.

Dickey Oil Co. No. 1 Ayers, SW SW NW sec. 12-27-2. H.F.W. 2,910-15 ft.; S.D.

D. R. Lauck No. 1 Parke, SE SE NE sec. 17-25-2. Drlg. 1,600 ft.

Seward County

Helmerich & Payne No. 1 Hyde, C SW sec. 14-31-34w. Location.

Stafford County

Stanolind O. & G. Co. and Atlantic Oil Prod. Co. No. 1 Shotton, SW cor. sec. 27-22-13w. Anhydrite 736 ft.; K.C. 3,420 ft.; S.O. 3,549-63 ft.; coring 3,714 ft.

Sumner County

Craft & Wilson No. 1 Nevitt, NE NW NE sec. 36-32-2e. Stalnaker 2,223 ft.; K.C. L. 2,608 ft.; S.O. 2,772-83 ft.; set 6-in. csg.

Helmerich & Payne et al No. 1 Elwell, NW NW NE sec. 18-34-1. Chat 3,867 ft.; S.D. 4,000 ft.

D. L. Husted et al No. 1 Evers, SE SE NE sec. 27-31-2. Set 12-in. csg. 412 ft.

Matthews & Derrington No. 1 Berry, NW NW SE sec. 14-35-1. S.G. 2,187 ft.; drlg. 2,565 ft.

Pryor & Lockhart et al No. 1 Knowles, SW cor. sec. 30-30-1. K.C. L. 2,858 ft.; Chat 3,489-96 ft.; R.U.S.T.; drlg. cmt.

E. B. Shawver No. 1 Judd, SW SE NE sec. 3-34-2. R.U.

Texas Co. No. 1 Reed, NE SE SE sec. 11-31-1w. Drlg. 150 ft.

Wilcox O. & G. Co. et al No. 1 Hess, SE SE NW sec. 13-34-2w. Chat 4,120 ft.; S.G. 4,120-50 ft.; drlg. 4,224 ft.

D. J. Wilson et al's No. 1 Clark, 1,320 ft from W and 25 ft. from S line of NW sec. 15-35-1w. C.O. 4,170 ft.

Trego County

Central Commercial's No. 1 Wagg, NW NW SE sec. 17-13-21w. K.C. lime 3,548 ft.; bailed 10 bbls. oil in 8 hrs. at 3,950 ft.; T.D. 3,972 ft.; cmtg. cave.

J. J. Hall et al No. 1 Deines, SE SE SE sec. 12-13-24w. R.U.

R. B. McNeely et al No. 1 Lemke, NW NW SW sec. 7-11-23w. Rotary rig.

Woodson County

N. C. Dunn No. 1 Dawson, C NW NE sec. 27-26-13. L. 1,505 ft.; T.D. 1,527 ft.; P.B. 1,500 ft.; H.F.O.; no test.

Foster et al No. 1 Timm, SE NW NE sec. 36-25-13. S.O. 602-07 ft.; H.F.W. 612 ft.; T.D.; P.B. 607 ft.

Roy Johnson No. 1 Hare, C N½ NW NE sec. 32-25-14. T.D. 1,452 ft.; D.&A.

Mendenhall et al No. 1 Hunter, NE cor. sec. 36-25-14. Sand 1,485-1,502 ft.; T.D.; H.F.W.; D.&A.

C. L. Sheedy No. 1 Abbott, NE NE SW sec. 16-25-14. R.U.

C. L. Sheedy No. 1 Baker, SE SE NW sec. 2-26-14. T.D. 1,577 ft.; D.&A.

C. L. Sheedy et al No. 1 Fuhlhage, NE NW SW sec. 27-25-14. Loc.

Seminole County

Ark Royalty Co. No. 1 Kiker, SE SE NE sec. 9-10-7. Spudded and S.D.

Feimlee & Nichaelson No. 1 Belford, SE NW NE sec. 15-9-8. Sd. 1,460-1,595 ft.; S.O.&G.; S.D. 1,650 ft.

Tom Phillips & Kinrow Drlg. Co. No. 1 Chepharney, SE SE NW sec. 7-6-7. Rig.

Washita County

L. P. McWhirter's No. 1 fee, SW cor. Sec. 34-8n-19w. T.D. 1,465 ft.; S.D.

SOUTHERN OKLAHOMA

Atoka County

Phelps & Coats et al No. 1 Fidelity Life Ins. Co., SE SW NW sec. 23-1s-12. Set 10-in. csg. 470 ft.; drlg. ahead.

Riverland Oil Co. No. 1 Jones, SW SW NE sec. 4-3s-9e. Hunton 1,517 ft.; Sylvan 1,573 ft.; fsg. at 1,740 ft.; T.D.

Carter County

Carter Oil Co. No. 1 Carter-Williams, SW NE SW sec. 27-2s-3w. T.D. 5,105 ft.; flowed 3,309 bbls. first 24 hrs.; shut in.

Carter Oil Co. et al No. 1 Leon Voorhees, C SE SW sec. 34-5s-2w. Drlg. 5,262 ft.

W. E. Hammond No. 1 J. Rile, SW SE SE sec. 8-5s-1e. Drlg. 200 ft.

Texas Co. No. 1 Cathey, SE NE NE sec. 6-5s-1w. T.D. 4,191 ft.; pumping 20 bbls. daily, may deepen.

Cotton County

English Drlg. Co. No. 1 Wilson, NW NW SE sec. 7-4s-11w. T. D. 1,514 ft.; S.D.

Harmon County

Lloalko Trust, Ltd. No. 1 Crosnoe, SE SE SW sec. 14-3n-25w. T.D. 2,263 ft.; S.D.

Jackson County

C. P. Burnham No. 1 Oliver, NW NW SE sec. 26-1-20w. Granite Wash 1,350 ft.; gas 500,000 ft.; T.D. 1,685 ft.; S.D.

John Dickson et al No. 1 W. B. Wright, NE NW SE sec. 19-1-19w. R.U.R.

A. H. Jackman No. 1 fee, SW SW SW sec. 27-1s-24w. T.D. 2,685 ft.; fsg.

Pioneer Oil Co. No. 1 N. Rawls, SW NW NE sec. 26-1-20w. T.D. 26 ft.; S.D.

Universal Oil Co. No. 1 R. W. Briscoe NW SW NE sec. 36-1s-20w. T.D. 3,004 ft.

Jefferson County

A. T. Campbell No. 1 Trout, SE NE NE sec. 6-3s-7w. Sd. 1,525-57 ft.; T.D. 2,064 ft.; S.D.

Pearson et al No. 1 Douthitt, NE cor. sec. 24-6s-9w. Material on ground.

Johnston County

Equitable O. & G. Co. No. 1 Bellsey, NE SW sec. 13-2s-4e.
Arbuckle lime 1,552 ft.; drlg. 1,938 ft. in lime.

Magnolia Pet. Co. No. 1 Green, NE cor. flowed 225 bbls. in 7 hrs., and 203 bbls. sec. 12-2s-7. Hunton 1,138 ft.; Sylvan 1,395 ft.; Viola 1,547 ft.; Bromide 1,932 ft; Wilcox 2,530 ft.; T.D. 2,535 ft.; 190 ft. Sulfur wtr. in hole; S.D.

Moore & Wirick No. 1 Westheimer & Daube, SE NW NE sec. 19-3s-4e. Drlg. 3,980 ft. in shale.

Love County

Amerada Pet. Corp.'s No. 1-A Westheimer & Daube, SW SE SW sec. 27-6s-2e. T.D. 7,363 ft. in L.; P.B. 5,115 ft.; acidized.

J. B. Russell et al No. 1 Scott, SW SE SW sec. 29-8s-2e. T.D. 4,968 ft.; S.D. for orders.

Sinclair Prairie Oil Co.'s No. 1 Stockton, SE SE SW sec. 26-6s-2w. T.D. 6,914 ft.; sd. 6,899-6,909 ft.; flowed and swbd. 324 bls. oil in 5 days; drlg. 8,420 ft. in shale.

Marshall County

Helmerich & Payne No. 1 Taliaferro, NW SE SW sec. 26-5s-5e. Rig.

Pushmataha County

C. W. Whitehead et al No. 1 Misser, SE SW SW sec. 25-3s-18e. T.A.; T.D. 3,560 ft.

Stephens County

W. G. Endicott et al No. 1 McFatridge, NW NW SW sec. 11-3s-9w. T.D. 1,369 ft.; set 6-in. csg.

T. H. McCasland No. 1 J. C. Parker, NE NE SW sec. 2-1n-6w. T.D. 2,212 ft.; running core bbl.

Tillman County

G. Birnheim No. 1 Tate, NE NE NW sec. 16-1s-19w. Location.

Gulf Oil Corp. et al No. 1 McWilliams, NW SW SW sec. 15-3s-17w. Rig.

Gulf Oil Corp. No. 1 Wearmouth, SE NW SE sec. 31-1s-18w. Drlg. 4,533 ft.

Johnson, Young & Mitchell No. 1 Donahoe, SW NW NW sec. 7-4s-17w. Drlg. 1,040 ft.

Shirley, Clum et al No. 1 Moricle, NW NW SE sec. 16-4s-14w. R.U.

D. S. Smith No. 1-A Hammill, NE NE NW NW sec. 6-5s-15w. T.D. 1,125 ft.; S.D.

OKLAHOMA

Week Ending May 16

NORTHERN OKLAHOMA

Beckham County

Jo-Gail Drlg. Co. No. 1 Gilliland, C NE NE sec. 32-8-26w. Loc.

Wood Pet. & Royalty Corp. No. 1 Blair, C NW SE sec. 32-9-26w. Granite wash 2,943-71 ft.; granite 2,984 ft.; T.D. 2,989 ft.; D.&A.

Cleveland County

Hall-Briscoe, Inc. No. 1 Fant, S.W SW NE sec. 27-10-2w. S.D. at 7,511 ft.

Asa Lee Mayes, Inc., No. 1 Parsons, SW SW SE sec. 30-9-1. T.D. 3,510 ft.; tools moved out, may make new contract.

Coal County

Shell Pet. Corp. No. 3 Hill, SE SE NW sec. 30-3-10. Hunton 5,280 ft.; Sylvan 5,355 ft.; Viola 5,448 ft.; S.O. 5,540-57 ft.; Bromide 5,560 ft.; McLish 5,720 ft.; cd. 5,946-6,046 ft. in Dolomite; drlg. 6,263 ft.

Garfield County

Herndon Drlg. Co. et al No. 1 Branson, SW SW SE sec. 23-24-2w. Drlg. 4,780 ft.

W. J. Sherry et al No. 1 Haken, NW NW SW sec. 32-20-10w. Miss. lime 5,960 ft.; whipstock 5,839 ft.; drlg. by 6,202 ft.

Stanolind O. & G. Co. et al No. 1 Brunken, SW SW NE sec. 32-22-4w. Top Dense 5,915 ft.; Dolomite 5,935 ft.; first Wilcox 5,975 ft.; second Wilcox 6,033 ft.; T.D. 6,051 ft.; hole filled with 3,200 ft. oil; S.D. for tanks.

Garvin County

Charles E. Carter et al No. 1 Wood, NW SW SE sec. 5-4-3. O.W.D.D.; drlg. 2,754 ft.

McElreath & Suggett No. 1 Lasater, SE SE SW sec. 2-2-1w. Rig.

Hughes County

Blackwell Oil & Gas Co., No. 1 Long, SE NE NW sec. 29-9-9. Sand 1,215-35 ft.; H.F.W.

M. H. Halsey No. 1-A Eustep, NW NW SW sec. 11-8-9.
Wapanucka 3,428 ft.; Cromwell 3,462 ft.; T.D. 3,464 ft.; 2 bailers wtr. an hr.; P.B. and shot, 3,030-45 ft.; est. 10,000,000 ft of gas; P.B. to 3,412 ft.; re-shot.

George Orr et al No. 1 Morgan, NE SE SW sec. 6-7-9. Cellar and pits.

Phillips Pet. Co. No. 1 Eberle, NE NE SW sec. 12-5-9. Wapanucka 3,337 ft.; Cromwell 4,368 ft.; drlg. 5,102 ft.

Sinclair Prairie Oil Co. et al No 1 Wilkiy, SW cor. sec. 23-9-8. R.U.R.

Sivalls et al No. 1 Montgomery, NW SW NW sec. 7-9-9. Booch 2,950 ft.; Gilcrease 3,100 ft.; drlg. 3,230 ft.

Kay County

W. O. Allen No. 1 Fulton, SE cor. sec. 18-27-4. Drlg. 850 ft.

Kiowa County

Atlantic Oil Producing Co. No. 1 Ta-Home, NE NW NE sec. 24-7-16w. Drlg. 1,105 ft.

W. C. Adams et al No. 2-A Stone, C ne SE NE sec. 34-7-17w.
T.D. 1,193 ft.; machine moved out

Beeler & Klein No. 1 Parrish, SE SE NW sec. 3-6-15w. Machine.

E. A. De Bolt et al No. 1 Burnett, NW SE NE sec. 30-7-20w. Location.

Joe Hooser No. 1 Sonamaker, SE SW SW sec. 24-7-21w. Drlg. 420 ft.

Le Flore County

McCraw et al No. 1 Tidwell, C NW SE sec. 17-3-22. T.D. 1,555 ft.; S.D.

Lincoln County

Amerada Petroleum Corp. et al No. 1 Zimmerman, SW SW NE sec. 10-12-5. R.U.R.

Logan County

W. N. Anthony and H. G. Marshall No. 1 Fruin-Eckman, SE SE SW sec. 4-16-1. T.D. 5,285 ft.; P.B. 5,181 ft.; bailing to C.O.

McClain County

Arab Pet. Corp. No. 1 Autry, NW cor. sec. 16-7-3w. T.D. 3,665 ft.; can't get back on bottom.

McCurtain County

Louis Sikes No. 1 Mitchell, C NW SW sec. 12-9s-26. Spudded and S.D. for 30 days.

McIntosh County

Indian Ty. Ill. Oil Co.'s No. 1 Tancred. 1,050 ft. S and 390 ft. E of C. Sec. 9-9-14. Wilcox 4,525 ft.; T.D. 4,536 ft.; 300 ft. wtr. in hole; P.B. to 3,272 ft.

Oklahoma Oil Corp. No. 1-A Wolf, SE SW SE sec. 35-12-17. Viola 3,378 ft.; Wilcox 3,428 ft.; H.F.W. 3,570 ft.; T.D.; D.&A.

Noble County

Continental Oil Co. No. 1 Pruitt, NW SE SW sec. 19-20-1w Oswego 4,388 ft.; Viola 4,972 ft.; T.D. 5,142 ft.; P.B. 5,115 ft.; shot swabbed 5 bbls. oil 15 bbls. wtr.; acidized.

Stanolind O. & G. Co. and Amerada Pet. Corp. No. 1 Gillham, NE SE SE sec. 14-22-1. Location.

Okfuskee County

Amerada Pet. Corp. and Stanolind O. & G. Co. No. 1 Wells, SW SW NW sec. 7-11-7. Oswego 2,690 ft.; Calvin 2,714 ft.; drlg. 3,985 ft.

Champlin Ref. Co. No. 1 Thompson, SW SW NW sec. 7-13-8. Fsg. 1,147 ft.

Manahan & Grisso No. 1 Dalton, SE SE SE sec. 36-10-8.
Senora sand 1,723 ft.; T.D. 1,763 ft.; flowed 75 bbls. oil first hour after shot; in 9 hrs.; lost 4 hrs. while cleaning out.

Oklahoma County

I. D. O'Shaughnessy, Inc. No. 1 Berlowitz, SE SW NE sec. 9-12-3w. Cellar cmtd.

H. R. Hollenback et al No. 1 Cooper, NW NW NE sec. 15-11-1. Oswego, 5,425 ft. Hunton 5,857 ft.; Sylvan 5,998 ft.; Viola 6,093 ft.; Simpson 6,133 ft.; drlg. 6,235 ft.

Osage County

Champlin Ref. Co. No. 1 Osage, SW SW NE sec. 35-25-6. T.D. 2,085 ft.; U.R.

Elfred Beck No. 1 Osage, SE SE NE sec. 16-23-7. S.D. 2,581 ft. for pipe.

Gray & Folson No. 1 Osage, SW SW NE sec. 33-25-7. Drlg. 525 ft.

Midco Oil Corp. et al No. 1 Osage, NW NW SE sec. 11-23-6. Drlg. 1,350 ft.

Stoner Bros. No. 1 Osage, NW NE SW sec. 18-22-8. Loc.

Payne County

Amerada Pet. Corp. and Stanolind O. & G. Co. No. 1 Pratt, SE cor. sec. 29-19-5. Rig.

Denver Producing & Ref. Co. et al No. 1 Pratt, NW cor. sec. 20-18-3. Drlg. 1,000 ft.

Pontotoc County

Sandback et al No. 1 Sanda, NE NE NE sec. 20-3-5. T.D. 475 ft.; C.O.

Southard & Miller No. 1 Wilson, NW SE SW sec. 26-4-5. Spudded and S.D.

Pottawatomie County

Ross Oil Co. et al No. 1 Sparkman, SE NE sec. 32-8n-4e.
C.O. 3,915 ft.; shot at 3,871-90 ft.; swbd. 250 bbls. in 24 hrs.; acidized.

J. L. Shaw No. 1 Illinois Life, NW SE NW sec. 1-4-5. Drlg. 1,590 ft.

ARKANSAS

Arkansas County

Ark. O. & G. Co. No. 3 Fischer, 250 ft. S, 200 ft. E, NW cor. NE NW sec. 6-4w. Rig; S.D. W.O.

Bradley County

Phillips Pet. Co. No. 1 C. H. Murphy et al, NW cor. NW NW sec. 12-17-11. Loc.

Calhoun County

Ben G. Barnett No. 1 Freeman Smith, SE cor. sec. 36-15-14. Set 10-in. 1,600 ft.; cg. 2,660 ft.

T. R. Brown et al No. 1 Calion Lbr. Co., C S½ SE SW sec. 22-15-15. Loc.

Clark County

Soris Tripanoff. tr., No. 1 W. Gibbons, sec. 27-8-18. Prep. to set csg. 557 ft.

Columbia County

J. C. Buckbee, Tr., No. 1 Wilson, 330 ft. N and E, C sec. 17-17-18. S.D. 2,865 ft.

Crawford County

Carter Oil Co. and Donald Trumbo No. 1 Cradduck, C NW NE sec. 3-11n-30w. Prep. set csg. 1,230 ft.

Dallas County

Kel-Mac Lease & Royalty Co. No. 2 R. Owens, NW cor. NW SW sec. 26-10-16. S.D. 1,580 ft.

Hempstead County

Dixie Drlg. Co. No. 1 Wheatley, 330 ft. S. 30 ft. E, NW cor. SW NE sec. 14-11-26. R.U. and W.O.O.

Fitzwater et al No. 2 Lafferty, C NW sec. 17-14-24. Tested S.W. and W.O. 2,180 ft.

Murdock-May & Easton No. 1 Conway est., 330 ft. N and E, SW cor. NW SW sec. 17-14-24. Set 12½-in. 80 ft.; drlg. 810 ft.

LaFayette County

Earl F. Fox No. 2 Coleman Bros., NE NE sec. 30-16-24. S.D. 3,760 ft.

Erwin & Leach No. 3 Bodcaw Lbr. Co., 330 ft. S and E, NW cor. sec. 20-16-13. Drlg. 7,527 ft.

Joe Modisett No. 1 Red River Lbr. Co., C SW SW sec. 21-19-14. Drlg. 5,835 ft.

Little River County

Roberts et al No. 1 Hall, sec. 22-13-29. O.W.D.D.; drlg. 1,890 ft.

Lonoke County

Frank F. Silver et al No. 1 Joe Chambers, C NE sec. 17-2n-7w. Drlg. 1,470 ft.

Miller County

Deep Rock Oil Corp. No. 1 Williams, NW cor. SW NW sec. 6-16-25. Loc.

Odell Hinson No. 1 Montana Realty Co., NE cor. NW NW sec. 3-17-28. Set 12¼-in. csg. 238 ft.; S.D.O.

J. W. Jones et al No. 1 J. H. Bush, sec. 2-19-27. Loc.

King Oil Corp. No. 1 G. W. Crank, SW NE sec. 19-16-25. S.D.; W.O. 3,906 ft.

King Oil Corp. No. 1 Mann, NW cor. NW SE sec. 2-16-26. M.I.R.

C. V. Lenz No. 8 Dale, sec. 24-15-26. Cg. 5,826 ft.

M. L. Luckett No. 1 Beck, sec. 34-15-24. S.D. 2,680 ft.

L. H. Mahon et al No. 1 Miller Land & Timber Co., SW cor. SE sec. 29-18-27. S.D. 1,845 ft.

McAlester Fuel Co. No. 1 J. N. Cook, sec. 18-20-27. Loc.

Ouachita County

Carnes & Harrell No. 1 Dunn & Robinson, new loc., 440 ft. S, 440 ft. E, NW cor. NW SE sec. 7-12-19. Set 12½-in. csg. 180 ft.

Delta Drlg. Co. No. 1 Colin Lbr. Co., new loc. SE¼ SE¼ sec. 22-15-15. Abd. loc.

Lion Oil Ref. Co. No. 1 Reynolds, C E½ SE NE sec. 28-15-15. Loc.

L. L. McDonald No. 1 Langley, 330 ft. N and E, SW cor. NE SW sec. 19-15-15. Cg. 2,040 ft.

Phillips Pet. Co. No. 1 Arnold, 660 ft. S and 330 ft. E, NW cor. NE sec. 27-15-15. Loc.

Phillips No. 9 J. Elder, 660 ft. N and 330 ft. W, SE cor. NW SW sec. 28-15-15. Drk. pat.

Phillips No 1 E. Gotte, 660 ft. N and 330 ft. E, SW cor. NE sec. 27-15-15. Loc.

Phillips Pet. Co. No. 1 Murphy, C E½ NE NE sec. 28-15-15. Loc.

J. D. Reynolds No. 1 McKenzie, 204 ft. S, 300 ft. W, NE cor. SE SW sec. 36-15-16. Fsg. for cable tools 1,970 ft.

Standard Oil Co. of La. No. 3-B Reynolds, 660 ft. N and 330 ft. W, SE cor. NW SW sec. 27-15-15. Loc.

O. F. Whittaker, Tr., No. 1 S. Howard, 600 ft. E and 150 ft. N, SW cor. NW NE sec. 20-12-16. Cg. 1,396 ft.

Union County

Arkansas Southern Oil Co. No. 1 F. R. Laney, sec. 30-19-16. S.D. 175 ft.

Ark.-Southern Oil Co. No. 1 M. H. Simmons, NW cor. NW NE sec. 15-18-13. Drk.

J. C. Bucbee No. 1 Exzell, SW cor. NE NW sec. 13-17-15. Drlg. 2,747 ft.

J. E. Crosbie, Inc., No. 5 M. M. Sullivant, 393 ft. N and 341 ft. W, SE cor. SE NW sec. 12-17-14. Set 10-in. 130 ft.; cg. 3,160 ft.

Kinnebrow & Simpson No. 1 L. Adams, SW cor. NE NE sec. 12-17-14. Drlg. 650 ft.

Marine Oil Co. No. 1 Simmons, 250 ft. S and W, NE cor. SE NW sec. 10-18-13. Drk.

McCressien Oil Co. No. 2 D. Norman, NE cor. NE SE sec. 3-18-13. W.O. jack to pump, 3,556 ft.

LOUISIANA

NORTH LOUISIANA PROVEN

Caddo—Bodcau

American Lib. O. Co. No. 1 Norton, 330 ft. S and 330 ft. W, NE cor. sec. 17-23-15. Loc.

Ark.-La. Gas Co. No. 12 Rodessa Oil & Land Co., NW SE sec. 22-23-16. Cmtd. 7-in. 5,982 ft.; comp.; 6,010 ft., T.D.; 25B.O.P.H.; ¼-in. tbg. ch.

Ark.-La. Gas Co. No. 13 Rodessa O. & L. Co., 2,330 ft. N and 1,136 ft. W, SE cor. sec. 22-23-16. R.U.

Ark.-La. Gas Co. No. 14 Rodessa O. & Land Co., SW cor. NW sec. 23-23-16. Cmtd. 7-in. 5,995 ft.; comp. 6,014 ft., T.D.; 20 B.O.P.H.; ¼-in. tbg. ch.

Ark.-La. Gas Co. No. 15 Rodessa Oil & Land Co., NE cor. SW NW sec. 23-23-16. Cg. 5,930 ft.

Ark.-La. Gas Co. No. 16 Rodessa Oil & Land Co., SE cor. NE sec. 22-23-16. Set 10-in. 3,316 ft.; drlg. 5,108 ft.

Ark.-La. Gas Co. No. 17 Rodessa O. & L. Co., SE cor. SW NW sec. 23-23-16. Drlg. 1,096 ft.

Ark.-La. Gas Co. No. 18 Rodessa O. & L. Co., NW cor. sec. 23-23-16. Drk.

Blackwell O. & G. Co. No. 1 Nugent, SW cor. NE SE sec. 8-23-15. Cg. L. 6,060 ft.

S. P. Borden No. 1 K.C.S., NW cor. SW sec. 23-23-16. Cmtd. 5 3/16-in. 6,006 ft.; W.O.C.; comp. at 6,008 ft., T.D.; flowed 260 bbls. in 9 hrs.; perf. csg. 5,993-6,004 ft.

Canadian Oil Co. No. 1 Comegys, SE cor. sec. 10-23-16. Drlg. 1,980 ft.

Danciger O. & R. Co. No. 1 Francis heirs, C Lot 2, Blk. 10, sec. 23-23-16. Cmtd. 7-in. csg.; tstg.; T.D. 6,012 ft.

Danciger O. & R. Co. No. 1 J. F. Neugent, C Lot 3, Blk. 12, sec. 23-23-16. Perf. csg. 5,985-95 ft.; swb. tbg. 6,004 ft.; T.D.

Duncan & Woods No. 1 Andrews, Lot 5, Blk. 21, sec. 23-23-16. Cmtd. 7-in. 5,-006 ft.; T.D. 6,022 ft.

J. Edward Jones No. 1 Ashley, Lot 6, Blk. 13, sec. 23-23-16. Perf. csg. 5,995-6,005 ft.; comp. 119 bbls. dist. in 20 hrs.; T.D. 6,013 ft.

J. Edward Jones No. 1 Gibson, SW cor. SE SW sec. 23-23-16. Set 16-in. 250 ft.; drlg. 5,467 ft.

W. F. Lacy No. 1 Tyson, 789 ft. W and 338 ft. S. NE cor. SE NW sec. 24-23-16. Cmtd. 7-in. 5,875 ft.; comp. 5,997 ft., T.D. for 7 bbls. dist. per hr.; 10,000,-000 ft. gas.

M. H. Marr et al No. 5 Hunter, 990 ft. S and 1,316 ft. E, NW cor. SW sec. 12-23-16. Cmtd. 7-in. 6,062 ft.; T.D. 6,078 ft.; comp. 10 B.O.P.H.; 3/16-in. tbg. ch.

M. H. Marr et al No. 2 Peak, SW cor. SE sec. 11-23-16. Drlg. 4,686 ft.

R. W. Norton No. 2 Atkins Unit, NE cor sec. 18-23-15. Set 13⅜-in. 200 ft.; cmtd. csg. 6,006 ft.; comp. 10 B.O.P.H.; ¼-in. tbg. ch.; T.D. 6,040 ft.

R. W. Norton No. 3 Atkins Unit, 175 ft. S, 1,286 ft. W, NE cor. sec. 18-23-16. Loc.

R. W. Norton No. 2 Fosque Unit, SW cor. sec. 20-23-16. Drlg. 5,342 ft.

R. W. Norton No. 3 Foscue Unit, NE cor. sec. 29-23-16. Drlg. 2,076 ft.

R. W. Norton No. 4 Foscue Unit, SE cor. sec. 20-23-16. Drlg. 2,356 ft.

R. W. Norton No. 4-A Caddo Levee Board NW NE sec. 21-23-16. Cmtd. 7-in. 5,971 ft.; comp. 35 B.O.P.H.; ¼-in. tbg. ch.; T.D. 5,992 ft.

R. W. Norton No. 5-A Caddo Lv. Bd., 2,-640 ft. N and 660 ft. W, C sec. 28-23-16. Loc.

R. W. Norton No. 6-A Caddo Lv. Bd., 2,-640 ft. N and 660 ft. W, C sec. 28-23-16. R.U.

R. W. Norton No. 4 Tyson heirs, 2,943 ft. N and 3,813 ft. E, SW cor. sec. 13-23-16. Drlg. 3,887 ft.

O'Brien Bros. No. 3 Rodessa Oil & Land Co., SW cor. NW SW sec. 14-23-16. Set 16-in. 230 ft.; drlg. 5,950 ft.

Phillips Pet. Co. No. 1 Adams, NW cor. sec. 17-23-15. Set 16-in. 253 ft.; drlg. 5,742 ft.

Phillips Pet. Co. No. 2 Adams, NW cor. NW NW sec. 17-23-15. Drlg. 4,572 ft.

Phillips Pet. Co. No. 4 Norton Est., SW cor. SW NW sec. 17-23-15. Cmtd. 7-in. 6,047 ft.; T.D. 6,068 ft.; tstg.

Phillips Pet. Co. No. 5 Norton Est., SW cor. NW sec. 17-23-15. Set 16-in. 239 ft.; W.O.C.

Phillips Pet. Co. No. 1 Robinson, C E½ NE SE sec. 18-23-15. P.B. from 6,028 ft. to 2,250 ft.

H. W. Snowden No. 1 Phillips, C Lot 11, Blk. 36, sec. 23-23-16. Set 16-in. 274 ft.

Standard No. 4 Caldwell, NW cor. SW SE sec. 12-23-16. Drlg. 3,700 ft.

Standard No. 14 Lawton, SW cor. NW SW sec. 14-23-16. Set 12½-in. 262 ft.; cmtd. 5,969 ft.; T.D. 5,983 ft.

Standard No. 15 Lawton, SW cor. SW NW sec. 14-23-16. Drlg. 5,469 ft.

Standard No. 16 Lawton, NE cor. SW NW sec. 14-23-16. Drlg. 5,187 ft.

Standard No. 6 Otwell, NE cor. SE SE sec. 15-23-16. Drlg. 5,122 ft.

Standard No. 7 Otwell, SW cor. SE SE sec. 15-23-16. Loc.

Standard No. 8 Otwell, NW cor. SE SE sec. 15-23-16. Loc.

Standard No. 3-A Mattie Pitts, SE cor. SE SW sec. 11-23-16. Comp.; T.D. 6,033 ft.; 84 B.O.P.H.; 1⅝-in. tbg. ch.

Standard No. 4-A M. L. Pitts, 330 ft. N and W, SE sec. 11-23-16. Loc.

Standard No. 2 Zylks, NE cor. SW sec. 16-23-16. Comp.; T.D. 6,000 ft.; 80 B.O. P.H.; 1⅝-in. tbg. ch.

Tri-State O. & G. Co. No. 1 F. L. Westbrook, C Lot 6, Blk. 12, sec. 23-23-16. Drlg. 4,514 ft.

United No. 1-574 fee, SE cor. sec. 16-23-16. Loc.

United No. 2 Brewer Unit, 655 ft. N and 656 ft. E, SW cor. sec. 21-23-16. Drlg. 3,727 ft.

United No. 4 Brewer Unit, NE cor. 55 ac., sec. 29-23-16. Cmtd. 9⅝-in. 2,186 ft.; W.O.C.

United No. 2 Harris, 326 ft. W, 330 ft. N, SE cor. SE SE sec. 15-23-16. Drlg. 4,-571 ft.

United No. 3 Harris, NE cor. sec. 15-23-16. Loc.

United Gas Pub. Ser. Co. No. 1 Maroun Unit, 330 ft. S and E. NW cor. sec. 24-23-16. Cmtd. 7-in. 6,044 ft.; tstg. 6,068 ft.

United Gas Pub. Ser. Co. No. 1 McCoy, NE cor. sec. 16-23-16. Drlg. 4,664 ft.

United Gas Pub. Ser. Co. No. 3 Miller, SW cor. NW NW sec. 14-23-16. Cmtd. 7-in. 5,993 ft.; T.D. 6,008 ft.

United No. 2 Mitchell, SW cor. of lse., sec. 20-23-16. Loc.

United No. 5 M. L. Pitts, 212 ft. N and 658 ft. W, SE cor. NW SE sec. 13-23-16. Drlg. 3,034 ft.

United No. 6 M. L. Pitts, 280 ft. S and 658 ft. W, NE cor. SW SE sec. 13-23-16. Drlg. 5,167 ft.

United No. 7 Pitts, NE cor. SW SW sec. 13-23-16. R.U.

United No. 8 Pitts, SW cor. of E 28 ac., NE SW sec. 15-23-16. Loc.

United No. 3 N. S. Spearman, SW cor. SE NW sec. 18-23-15. Set 13⅜-in. 315 ft.; W.O.C.

United Gas Pub. Ser. Co. No. 3 Thomas Unit, Lots 4 and 5, Blk. 5, Townsite, sec. 23-23-16. Set 7-in. 5,995 ft.; prep. to test 6,016 ft.

United Gas Pub. Ser. Co. No. 4 Thomas Unit, NW cor. NE NW sec. 23-23-16. Cmtd. 7-in. 5,996 ft.; T.D. 6,021 ft.; comp.; 72 B.O.P.H.; ⅛-in. tbg. ch.

United Gas Pub. Ser. Co. No. 5 Thomas Unit, NW cor. SE NW sec. 23-23-16. Drlg. 5,265 ft.

United No. 10 N. S. Tyson Unit, SW cor. SE SE sec. 11-23-16. Drlg. 2,730 ft.

United Gas Pub. Ser. Co. No. 17 Rodessa Oil & Land Co., NW cor. sec. 22-23-16. Set 13⅜-in. 313 ft.; drlg. 5,688 ft.

United Gas Pub. Ser. Co. No. 18 Rodessa Oil & Land Co., SW cor. NE SE sec. 15-23-16. Cg. 5,946 ft.

United Gas Pub. Ser. Co. No. 19 Rodessa Oil & Land Co., SE cor. NE SE sec. 15-23-16. S.D. 5,701 ft

United Gas Pub. Ser. Co. No. 20 Rodessa Oil & Land Co., SE cor. SE NE. Cg. 5,855 ft.

United Gas Pub. Ser. Co. No. 21 Rodessa Oil & Land Co., NE cor. SE NE sec. 15-23-16. Cg. 5,960 ft.

United Gas Pub. Ser. Co. No. 22 Rodessa Oil & Land Co., NW cor. sec. 15-23-16. Drlg. 4,206 ft.

Sabine Parish—Zwolle

Ellis Prod. Co. No. 1 Williams, 330 ft. S and W, NE cor. SE NE sec. 33-7-11. Tested dry; S.D.; W.O. 2,806 ft.

N. LOUISIANA WILDCATS

Bienville Parish

Rondeau et al No 1 Locke, 150 ft. S and 1,495 ft. W, NE cor. sec. 9-15-10. Drk.

A. C. Walters No. 1 D. B. Davis, C SE SW sec. 3-16-9w. Drk.

Bossier Parish

Geo. H. Bringhurst et al No. 1 Buckley NE SW sec. 36-21-13. Tested sl.; S.O.

Producers O. & G. Co. No. 1 Webb, C W½ SW sec. 22-17-12. Drk.

Tidwell et al No. 1 Nattin, 200 ft. S and W. C sec. 15-22-14. Set 10-in. 66 ft.; S.D. 1,650 ft.

United Gas Pub. Ser. Co. No. 1-A A. J. Murff, NW cor. sec. 17-17-11. Set 7-in. 4,930 ft.; P.B. from 5,409 ft. to 5,135 ft.; comp. 41,500,000 ft. gas; R.P. 2,160 lbs.

United Gas Pub. Ser. Co. No. 1-D H. L. Skannal, 660 ft. S, 561 ft. W, NE cor. SE sec. 22-17-12. Loc.

Caddo Parish

Calatex O. & G. Co. No. 1 Hudson, NW SW sec. 8-16-16. O.W.D.D. from 2,970 ft.; blg. 3,202 ft.

Falcon Oil Co. No. 15 Deckson, NW SE sec. 27-26-15. P.B. 2,343 ft.; old T.D. 2,349 ft.

C. G. Gibson No. 1 Morgan, 800 ft. S and 1,200 ft. W, NE cor. sec. 15-21-16. Tested. sl. sh. O. 1,921 ft.; D.&A.; S.D. 1,-921 ft.

Kenwood Pool, Ina., No. 1 W. K. Henderson, 1,980 ft. S and 200 ft. E, NW cor. sec. 15-19-15. Set 12½-in. 74 ft.

Bill Morefield et al No. 1 Stokely, 745 ft. S and 100 ft. E, C sec. 5-20-16. R.U.

Morris & Wooley No. 1 Pender, NW cor. SW sec. 11-20-15. Set 10-in. 60 ft.; set 6-in. 2,207 ft.

Persian Oil Co. No. 1 J. E. Cuppies, 500 ft. S and 350 ft. W, NE cor. sec. 24-16-13. Drk.

Press & Lambert No. 1 fee, SW cor. NE SE sec. 10-20-15. Drlg. 1,980 ft.

Pyramid O. & G. Co. No. 1-A S. R. Wheeler, 1,320 ft. S. 1,500 ft. W, NE cor. sec. 16-18-16. Cg. 5,077 ft.

Sport Oil Corp. No. 1-D Muslow, SE cor. sec. 5-20-15. Set 9⅝-in.; drlg. 3,035 ft.

Caldwell Parish

Critchett & Woods No. 1 Kyles, NE cor. SW NE sec. 13-11-3e. P.B. to 1,300 ft.; old T.D. 1,740 ft.; W.O.O.

Critchett & Woods No. 2 La. Cen. Lbr. Co., NW cor. NW SE sec. 18-11-3e. S.D.; rig repair, 1,003 ft.

Claiborne Parish

F. T. Oakes No. 1 H. W. Patton, NE cor. sec. 1-20-5. Jkd. old hole 4,242 ft.; skd. rig; set 10¾-in. 1,400 ft.; T.D. 1,430 ft.

Triangle Drlg. Co. No. 1 Kilpatrick, 660 ft. N and E, C sec. 7-19-5. D.S.T. 1,-000,000 ft. gas, 5,450-5,766 ft.; cmtd. 7-in. 5,407 ft.; T.D. 5,811 ft.; comp.; 4,-968,000 ft. gas; 3,310 lbs. R.P.

United Gas Public Service Co. No. 2 Durfett, 660 ft. N and 1,980 ft. E. SW cor. sec. 31-20-5. Gas odors in cores 6,713-25 ft.; sl. sh. oil 4,097-4,110 ft. and 4,-110-23 ft.; cd. 4,133 ft.

Concordia Parish

Zeni Oil Co. No. 1 Young, 1,200 ft. W, 100 ft. N, SE cor. sec. 28-6n-8e. S.D. 1,120 ft.

De Soto Parish

J. G. Carson No. 1 C. J. McMichael, sec. 26-13-15. Drk.

A. G. Halbach et al No. 1 Staton, 150 ft. N and E, SW cor. SE sec. 29-13-14. D.&A. 4,003 ft.

E. A. Stiller No. 1 Jenkins, 400 ft. S and 200 ft. W, NE cor. NW NE sec. 35-13-12. Drlg. 1,500 ft.

Tarbud Oil Co. No. 1 Caddo Realty Co., SW cor. sec. 2-13-16. Cg. 2,645 ft.

Franklin Parish

S. C. Jensen No. 1 Bailey, 660 ft. N and W, C sec. 12-11-6e. S.D.; rprs.; 1,270 ft.

Grant Parish

Acadian Prod. Corp. No. 7 Swope, NE cor. SE SE sec. 18-9-1e. S.D. 1,597 ft.; W.O.S.R.

Alexander et al No. 1 Maxwell, sec. 9-9-1e. W.O.S.R. 1,538 ft.

Taw Oil Co. No. 2 Bradford, sec. 16-9-1e. W.O.S.R. 1,546 ft.

Taw Oil Co. No. 1 Bradford, NE cor. NW sec. 16-9-1e. Set 10-in. 60 ft.; S.D.

La Salle Parish

Montagus Oil Co. No. 7-A Zenonia Lbr. Co., NE cor. sec. 10-9-1e. Tested S.W. and W.O. 1,520 ft.

H. T. Taylor No. 7 fee, 120 ft. N and 215 ft. E, SW cor. SW SE sec. 19-10-3e. Tstg. 1,580 ft.

Lincoln Parish

Caldwell Land & Timber Co. No. 1 J. K. Hammons, 330 ft. S and E. NW cor. SE SW sec. 30-18-1w. S.D. 665 ft.

Herman L. Brown et al No. 1 S. Gardner, 330 ft. N, 330 ft. E, SW cor. NW NE sec. 10-17-4w. Schlumberger s. sd. 5,664-71 ft. and 5,678-5,701 ft.; cg. deeper; tstd. S.W.

Morehouse Parish

J. B. Collins et al No. 1 E. M. Clarke, SE NE sec. 10-20-7e. Drk.

John E. Farrell No. 15 State, 1,203 ft. S and 68 ft. W. NE cor. sec. 28-21-4e. Comp.; T.D. 2,135 ft.; 6,000,000 ft. gas.

John E. Farrell No. 17 State, 1,262 ft. N and 1,739 ft. E. SW cor. sec. 33-21-4e. Comp.; 11,000,000 ft. gas; T.D. 2,135 ft.

United No. 37 Crossett, 1,321 ft. N and 1,324 ft. W, SE cor. sec. 15-21-4e. R.U.

United No. 38 Grossett, sec. 27-21-4e. Comp. 7,000,000 ft. gas; T.D. 2,179 ft.

United No. 17 Tensas, 1,320 ft. N and 1,-317 ft. W, SE cor. sec. 26-22-4e. Drk.

United No. 20 Tensas, sec. 9-21-4e. Comp. 5,000,000 ft. gas; T.D. 2,182 ft.

United No. 21 Tensas, sec. 10-21-4e. Cmtd. 6⅝-in. 2,070 ft.; T.D. 2,206 ft.

United No. 22 Tensas, 340 ft. W and 1,-002 ft. N, SE cor. sec. 4-21-4e. Loc.

United No. 23 Tensas, 2,559 ft. W and 1,-389 ft. S, NE cor. sec. 20-22-4e. Loc.

Red River Parish

I. J. Allen No. 1 Franklin Realty Co., sec. 20-11-9. Set 12½-in. 110 ft.; drlg. 2,750 ft.

Byrd Explo. Co. No. 1 Edge, NE¼, SE¼, sec. 29-13-11. R.U.C.T. 2,429 ft.

Byrd Explo. Co. No. 1 Waller, 1,570 ft. N and 1,520 ft. W, SE cor. sec. 20-13-11. R.U.

H. D. Conley et al No. 1 Long Bell Lbr. Co., NE NE sec. 19-13-9. Drk.

T. G. Shaw No. 1 Teekell, SE cor. SE SW sec. 34-13-10. Set 10-in. 62 ft.; drlg. 400 ft.

Richland Parish

J. S. Morrisey No. 1 Jones, 1,293 ft. N. 636 ft. E, SW cor. sec. 15-18-7e. Drlg. 1,485 ft.

Arthur Wray No. 1 Slocum, 2,436 ft. S. 560 ft. W, NE cor. sec. 10-17-6e. S.D. 1,676 ft.

Sabine Parish

I. J. Allen No. 1 Paul, sec. 24-9-14. R.U.

Circle W. Oil Co. No. 1 Cassell, 660 ft. E and 418 ft. S, C sec. 30-9-13. Drk.

M. C. Forsman No. 1 Patrick, NE SW sec. 21-9-13. Set 8-in. 75 ft.; drlg. 100 ft.

F. G. Cox No. 1 Whitney Corp., C NW NE sec. 8-9-13. Drlg. 1,750 ft.

Pearl Oil Co. No. 6 Crawford, C SE SE sec. 20-9-13. Loc.

Posey Sisters Oil Co. No. 2 A. J. Burkett, SW cor. SE NE sec. 10-9-13. Set 10-in. 40 ft.; trtd. acid 1,792 ft.; comp. pmpg. 20 B.P.D.

A. C. Scott No. 1 Bowman Hicks, 660 ft. S and 330 ft. E, NW cor. NW SW sec. 23-9-13. Drlg. 400 ft.

Claude H. Smith No. 1 Whitney Corp., 330 ft. S, 990 ft. W, NE cor. sec. 19-10-13. Set 7-in. 1,514 ft.; drlg. 3,046 ft.

A. H. Tarver No. 2 Baker, NW cor. NE sec. 36-8-12. D.S stuck 5,200 ft.

J. J. Watson No. 1 Rensaw, NW cor. SE SW sec. 29-9-13. Cmtd. 6-in. 1,540 ft.; tstg. 1,767 ft.

Lee Whitehurst No. 2 Latham, sec. 19-9-13. Set 7-in. 1,593 ft.; acid trtd. 2,128 ft.; W.O.O.

Whitehurst & Myers No. 1 Paul, SE cor. SW sec. 24-9-14. Swbg. 1,940 ft.

Tensas Parish

H. M. Jones et al No. 1 Chicago Mill & Lbr. Co., NE cor. sec. 30-12-10e. D.S.T. 761-83 ft.; est. 1,000,000 ft. gas; set csg.

Union Parish

Boucher & Pace No. 1 Frost-Johnson, NE NE sec. 27-21-1e. Drlg. 3,750 ft.

Carbons Consd. No. 1 Bird, SW cor. SE sec. 27-22-3e. Set 10-in. 202 ft.; comp.; T.D. 2,185 ft.; 1,000,000 ft. gas.

John E. Farrell No. 20 State, 988 ft. S and 4,261 ft. E, NW cor. sec. 4-21-4e. R.U.

Southern Carbon Co. No. 9 Grayling, 1,-260 ft. N and 1,954 ft. W, SE cor. sec. 8-21-4e. Drlg. 100 ft.

United Carbon Co. No. 4 Stovall, 1,698 ft. E and 2,201 ft. N, SW cor. sec. 33-21-4e. Loc.

United Gas Pub. Ser. Co. No. 3 Stovall, NE NW sec. 33-21-4e. Cmtd. 6-in. 3,-100 ft.

Vernon Parish

Liano Del Rio Co. No. 2 Gulf Lbr. Co., 1,-285 ft. S, 1,000 ft. W, NE cor. sec. 7-1n-9w. S.D. 3,240 ft.

Webster Parish

J. H. Edwards No. 1 Hooper, 330 ft. S and E, NW cor. SW sec. 8-17-9. Fsg. for rotary slip, 2,550 ft.

J. P. Evans et al No. 1 T. Crichton, NE SE sec. 35-18-9. Cmtd. 6⅝-in. 5,363 ft.; T.D. 5,532 ft.

[illegible] Oil Co. No. 1 R. L. Holloway, 660 ft. S, 760 ft. W, C sec. 23-21-10. Drlg. 7,560 ft.

SOUTH LOUISIANA FIELDS

Bayou Mallet—Acadia Parish

Superior O. & G. Co. No. 3 George Bradley, sec. 52-7s-1e. Drlg. sandy shale 2,-928 ft.

Black Bayou—Cameron Parish

Shell Pet. Corp. No. 31 Watkins, sec. 8-12-12w. T.D. 5,502 ft.; making electrical coring test.

Shell Pet. Corp. No. 33 Watkins, 65 ft. S cor. sec. 18-12s-12w. Drlg. sandstone 4,-794 ft.

Caillou Island—Terrebonne Parish

Texas Co. No. 34 State, sec. 24-22s-22e. T.D. 5,935 ft.; 7⅝-in. csg. at 5,891 ft.

Texas Co. No. 36 State. Coring sand showing oil at 5,348 ft.

Texas Co. No. 40 Caillou Isle, sec. 20-23s-20e. Coring sand showing oil 3,859 ft.

Cameron Meadows—Cameron Parish

Burton Sutton Oil Co. No. 13 School Land, sec. 16-14s-13w. Drlg. L. 5,370 ft.

Burton Sutton No. 14 School Land, sec. 16-14s-13w. Drk

Burton-Sutton No. 3-A School Land, sec. 16-14s-13w. Drlg. sand 3,454 ft.

Humble-Magnolia No. 16 Cameron Meadows. T.D. 5,326 ft.; perforated from 4,720-42 ft.; preparing to run screen and liner.

Humble-Magnolia No. 17 Cameron Meadows, sec. 21-14s-13w. Drk.

Chenevville—Rapides Parish

Texas Co. No. 1 State (Andrade), sec. 5-15s-2e. Cored to 5,713 ft.; run electrical coring test; S.D.

Texas Co. No. 1 Weihl, sec. 53-1s-2e. T.D. 189 ft.; W.O.C.

Choctaw Dome—Iberville Parish

Standard Oil Co. No. 8 Myrtle Grove Wilburt, sec. 52-9s-11e. T.D. 5,828 ft.; P.B. to 2,450 ft. and sdtkd.; coring rock 4,-072 ft.

Darrow—Ascension Parish

Humble O. & R. Co. No. 12 Community, sec. 30-10s-2e. 10¾-in. csg. at 1,965 ft.; drlg. shale 3,586 ft.

Dog Lake—Terrebonne Parish

Texas Co. No. 3 State, sec. 5-22s-16e. Drlg. shale 7,613 ft.

Four Isle—Terrebonne Parish

Texas Co. No. 5 State, sec. 24-21s-14e. Drlg. sand and shale 6,545 ft.

Gillis—Calcasieu Parish

Fohs Oil Co. No. 2 Ida Powers, sec. 14-9s-8w. T.D. 7,035 ft.; fishing for stuck drill stem.

Fohs Oil Co. No. 11 O. H. Castle, sec. 13-9s-8w. Drlg. shale and lime 4,555 ft.

Texas Co. No. 9 Nickerson fee, sec. 13-9s-8w. Drlg. shale 1,395 ft.

Union Sulphur Co. No. 1 J. A. Bel estate. T.D. 7,683 ft.; P.B. to 6,646 ft.; sdtkd. and drlg. at 6,697 ft.; P.B. to 6,623 ft.; W.O.C.

Union Sulphur Co. No. 1 G. S. Cole, sec. 12-9s-8w. T.D. 6,655 ft.; P.B. 3,816 ft.; coring sand at 4,781 ft.

Union Sulphur Co. No. 1 Green Acres, sec. 11-9s-8w. Drlg. shale and sand 6,-519 ft.

Union Sulphur Co. No. 16 State, sec. 11-9s-8w. 10-in. csg at 1,354 ft.; W.O.C.

Hackberry—Cameron Parish

Calcasieu Oil Co. No. 6 Hansen, sec. 14-12s-10w. T.D. 5,793 ft.; P.B. and stdkd.; drlg. shale 5,759 ft.

Gulf Ref. Co. No. 20 Irwin, sec. 12-12s-10w. Drlg. shale 8,379 ft.
Stanolind O. & G. Co. No. 16-A School Land, sec. 16-12s-12w. Drlg. shale 4,442 ft.
Stanolind O. & G. Co. No. 21-B Gulf Land sec. 14-12s-10w. S.D. 6,962 ft.; top salt 6,948 ft.; P.B. and sdtkd.; drlg. sh. and lime 6,027 ft.
Stanolind O. & G. Co. No. 23-B Gulf Land, sec. 14-12s-10w. Drlg.
Sutton Oil Co. No. 3 Duhon, sec. 22-12s-10w. T.D. 3,182 ft.; preparing to set csg. and test.
Texas Co. No. 31 State, sec. 12-12s-10w. Drlg.
Texas Co. No. 19-B State, sec. 13-12s-9w T.D. 6,724 ft.; P.B. to 4,628 ft.; sdtkd.; drlg. sand and shale at 4,911 ft.

Iowa—Jefferson Davis Parish

Shell Pet. Corp. No. 7 Stafford, sec. 18 9s-7w. T.D. 6,732 ft.; I.P. 268 B.P.D., 16/64-in. choke; T.P. 220 lbs.; C.P. 675 lbs.
Shell Pet. Corp. No. 1 Zimmerman. S.D. 5,386 ft.

Jeanerette—St. Mary Parish

Herton Oil Co. No. 2 Banta, sec. 40-13s-9e. T.D. 6,655 ft.; running 7-in. csg.
Herton Oil Co. No. 3 Banta, sec. 40-13s-9e. Coring sand 6,259 ft.
Herton Oil Co. No. 1 Carter, sec. 38-13s-9e Drlg. shale 5,325 ft.

Jennings—Acadia Parish

Fred I. Getty No. 2 Jennings-Clements (W.O.), sec. 46-9s-2w. T.D. 2,300 ft: tested S.W.; P.B. to 2,176 ft.; I.P. 40 B.P.D. on pump, 5 per cent S.W.
Port City Oil Co. No. 18 Heywood, sec. 41-9s-2w. R.U.
Reid Crude Oil Co. No. 9 Jennings. T.D. 2,087 ft.; 7-in. csg. 2,062 ft.; I.P. 160 B.P.D.
Shell Pet. Corp. No. 1 Conover, sec. 40-9s-2w. Coring shale 7,247 ft.
Stanolind O. & G. Co. No. 16 Houssiere-Latriell, sec. 47-9s-2w. Drlg. shale 6,396 ft.

Lafitte—Jefferson Parish

Texas Co. No. 4 Lafitte, sec. 20-17s-24e. Drlg. shale and lime 8,995 ft.
Texas Co. No. 4 Rigolettes Fur Co., sec. 29-17s-24e. Drlg. sand and lime 6,986 ft.

Lake Barre—Terrebonne Parish

Texas Co. No. 37 Lake Barre State. Drlg. sand and lime 4,692 ft.
Texas Co. No. 39 State, sec. 20-13s-20e. T.D. 3,774 ft.; I.P. 1,775 B.P.D.
Texas Co. No. 40 State, sec. 36-21s-19e. Drlg. Anhydrite 2,086 ft.

Lake Hermitage—Plaquemines Parish

Gulf Oil Corp. No. 3 LaFourche Basin Levee Board, sec. 11-18s-25e. Drlg. hard sand 3,647 ft.

Leesville—LaFourche Parish

Delta Oil Co. No. 1 Constantine, sec. 34-21s-22e. Drlg. shale 2,600 ft.
Lincoln Oil Co. No. 2 Constentine, sec. 27-21s-22e. T.D. 5,133 ft.; salt; P.B. 3,728 ft.; sidetracked at 2,141 ft.
Texas Co. No. 45 Leesville, sec. 34-21s-22e. T.D. 5,266 ft.; salt; P.B. 3,025 ft.; drld. to 3,333 ft.; set 7⅝-in. csg. at 3,308 ft.; I.P. 674 B.P.D.; T.P. 285 lbs.
Texas Co. No. 47 Leesville, sec. 27-21s-22e. Drlg. shale 3,669 ft.

New Iberia—Iberia Parish

Canal Oil Co. No. 3 Sabatier, sec. 54-1s-7e. S.D. 3,180 ft.; in salt.
Kitos Oil Co. No. 2-A Sealey, sec. 58-12s-7e. T.D. 4,560 ft.; P.B. to 2,200 ft.; W.O.C.
Teche Oil Co. No. 1 Schwing, sec. 52-13s-7e. T.D. 3,876 ft.; P.B. to 1,500 ft.; sidetracked and drlg. at 3,440 ft.
Texas Co. No. 1 Smith, sec. 72-12s-7e. Drlg. shale 6,077 ft.

Roanoke—Jefferson Davis Parish

Gulf Oil Corp. No. 2-B Anding, sec. 2-9s-4w. Drlg. shale and lime 5,954 ft.
Humble O. & R. Co. No. 3 C. N. Taylor, sec. 12-9s-4w. T.D. 8,850 ft.; 7-in. csg. at 8,849 ft.; I.P. 13 B.P.H., ⅝-in. choke; T.P. 350 lbs.
Humble O. & R. Co. No. 4-B Devilbiss, sec. 11-9s-4w. Drlg.
Shell Pet. Corp. No. 5 Kratzer, sec. 12-9s-4w. T.D. 8,681 ft.; 7-in. csg. at 8,668 ft.; I.P. 949 B.P.D., 14/64-in. choke; T.P. 950 lbs.; C.P. 1,050 lbs.

Port Barre—St. Landry Parish

Emerson Corp. No. 4 Sibille, sec. 29-4s-5e. T.D. 3,420 ft.; 7-in. csg. 3,410 ft.; deepened to 3,425 ft.; pumped 20 B.P.D.
Pan American Prod. Co. No. 2 Colmier, sec. 4-4s-5e. Drlg. shale 2,000 ft.
Texas Co. No. 1 Futral, sec. 20-4s-5e. Drlg. sandy shale 5,822 ft.
Texas Co. No. 1 Lahaye, sec. 4-6s-5e. Drlg. shale 4,405 ft.

St. Martinville—St. Martin Parish

Continental Oil Co. No. 1 fee, sec. 18-11s-6e. T.D. 3,150 ft.; P.B. to 7,370 ft.; drilled to 7,818 ft.; set 7-in. csg. on bottom; preparing to test.

Sorrento—Ascension Parish

Sorrento Oil Co. No. 1 Bernard, sec. 9-10s-4e. Derrick.

Sulphur—Calcasieu Parish

Union Sulphur Co. No. 824 fee, sec. 20-9s-10w. T.D. 4,526 ft.; P.B. 2,825 ft.; drilled to 3,917 ft.; 7-in. csg. at 3,898 ft.; W.O.C.
Union Sulphur Co. No. 828 fee, sec. 20-9s-10w. R.U.

Tepetate—Acadia Parish

Continental Oil Co. No. 1 Hugh Breckenridge, sec. 29-7s-2w. Drlg. shale 7,901 ft.
Continental Oil Co. No. 1 Doris Fruge, sec. 28-7s-2w. R.U.
Continental Oil Co. No. 3 Homeseekers, sec. 29-7s-2w. 10-in. csg. at 1,500 ft.; W.O.C.
Continental Oil Co. No. 1 P. Johnson, sec. 30-7s-2w. T.D. 8,317 ft.; 7-in. csg. on bottom.
Continental Oil Co. No. 2 L. L. Welch, sec. 28-7s-2w. Drlg. shale and shells 4,400 ft.
General Crude Oil Co. No. 1 Vincent, sec. 31-7s-2w. Coring sand; no show 8,843 ft.

Vinton—Calcasieu Parish

Vinton Pet. Co. No. 1 fee, sec. 34-10s-12w. Drlg. gumbo 2,411 ft.
Wilson Broach No. 19 Wilson Strip, sec. 33-10s-12w. Drlg. shale 4,545 ft.

White Castle—Iberville Parish

Shell Pet. Corp. No. 3 Shingle. 650 ft. S. 600 ft. E of NW cor. sec. 12-11s-12e. T.D. 5,763 ft.

S. LOUISIANA WILDCATS

Acadia Parish

Magnolia Pet. Co. No. 1 Homeseekers Dev. Co., sec. 54-10s-1w. Drlg. wtr. sand 7,772 ft.

Allen Parish

Humble O. & R. Co. No. 1 J. A. Bell, sec. 28-6s-7w. Drlg. shale 7,267 ft.

Avoyelles Parish

Frost Oil Co. No. 1 Hinds Lbr. Co., sec 3-3n-4e. R.U.

Cameron Parish

Magnolia Pet. Co. No. 1 Hebert, sec. 13-12s-9w. Drlg. shale 7,002 ft.

Iberia Parish

Jefferson Lake Oil Co. No. 1 State. Twp 12s-5e. T.D. 8,610 ft.; P.B. to 8,483 ft.; perf. from 8,460-66 ft.; S.D.
Jefferson Lake Oil Co. No. 322 State Lake Pleasneur. S.D. 5,690 ft.
Texas Co. No. 2 State, sec. 35-11s-8e. Driving piling.

Jefferson Davis Parish

Shell Pet. Corp. No. 1 Lacassan, sec. 20 11s-5w. T.D. 9,523 ft.; 7-in. csg. on bottom; W.O.C.
Strake Oil Corp. No. 1 Onezia Miller Est., sec. 7-9s-5w. Drlg. shale 500 ft.

Livingston Parish

Bunte O. & G. Co. No. 1 Addison Trust Co., sec. 7-7s-3e. Drlg.

St. Bernard Parish

John Cartwright No. 1 Meraux Nunez, sec. 19-13s-12e. Spudded.

St. James Parish

Shell Pet. Corp. No. 1 Colonial Sugar sec 5-12s-5e. Coring sandy shale 7,074 ft.

St. Landry Parish

Limited Oil Co. No. 1 Miller Est., sec. 47-8s-4e. Drlg. shale 7,870 ft.

St. Martin Parish

Southern Oil (S. C. Yingling et al) No 1 State, sec. 13-9s-8w. T.D. 3,172 ft.; tested S.W.; P.B. to 1,400 ft.; preparing to sidetrack.
Texas Co. No. 2 State, sec. 14-10s-9e. Drlg. sandy shale 2,076 ft.
Texas Co. No. 8 St. Martins Land sec 7 8s-7e. T.D. 8,213 ft.; D.S. stuck; shot off at 5,050 ft.; fishing.
S. C. Yingling et al No. 2 State, sec. 13-9s-8w. Driving piling.

Terrebonne Parish

Humble O. & R. Co. No. 1 Continental Land & Fur Co., sec. 30-17s-14e. M.I.R.

Vermillion Parish

Continental Oil Co. No. 1 O. C. Hebert sec. 20-12s-3e. Drlg. sandy shale 7,371 ft.
Louisiana Land & Expl. Co. No. 1 La. Fur Co., sec. 16-15-1e. Drk.

TEXAS

Week Ending May 16

GULF COAST FIELDS

Raccoon Bend—Austin County

Humble O. & R. Co. No. 9 Wilson, Wm. Harvey Sur. T.D. 4,100 ft.; 7-in. csg. at 4,031 ft.; I.P. 54 B.P.H., ¼-in. choke; T.P. 400 lbs.; C.P. 540 lbs.
Humble O. & R. Co. No. 10-X Hellmuth, Wm. Harvey Sur. 10¾-in. csg. at 1,100 ft.; drlg. sand at 2,900 ft.

Hastings—Brazoria County

Humble O. & R. Co. No. 2-B Cannon, H T.&B. Sur. T.D. 6,070 ft.; 7-in. csg. at 6,042 ft.; comp.; no gauge.
Stanolind O. & G. Co. No. 1 Brown, H.T. &B. Sur. Drlg. sand and shale 2,440 ft.
Stanolind O. & G. Co. No. 3 Cannon, H. T.&B. Sur. No. 36. T.D. 5,853 ft.; rng. 7-in. csg. at 5,618 ft.; I.P. 206 bbls. in 8 hrs., ¼-in. choke; T.P. 915 lbs.; C.P. 915 lbs.
Stanolind O. & G. Co. No. 5 B. L. Turner, A.C.H.&B. Sur. No. 1. Drlg. shale and shells at 4,303 ft.
Stanolind O. & G. Co. No. 4 Williams, A.C.H.&B. Sur. No. 1. T.D. 6,080 ft.; 7-in. csg. at 6,004 ft.; testing.
Stanolind O. & G. Co. No. 5 H. G. Williams, A.C.H.&B. Sur. Derrick.
Stanolind O. & G. Co. No. 4 Wooster, A C.H.&B. Sur. No. 1. Drlg. lime 5,138 ft.

Old Ocean—Brazoria County

Harrison & Abercrombie No. 1 Armstrong Plantation fee, Polly and Chance Sur. Rig up.

Manvel—Brazoria County

Texas Co. No. 22 Houston Oil Field Assn., A.C.H.&B. Sur. No. 1. T.D. 1,128 ft.; 10-in. csg. at 1,119 ft.
Texas Co. No. 2 Smith, H.T.&B. Sur. Drlg. shale and lime at 3,128 ft.
Texas Co. No. 22-B Belcher, H. N. Little Sur. Drlg. sandy shale 5,249 ft.
Texas Co. No. 23-B Belcher, H. N. Little Sur. Drlg. shale and lime 4,580 ft.

West Columbia—Brazoria

Texas Co. No. 13 Abrams, George Tennille Sur. Derrick.

Anahuac—Chambers County

Humble O. & R. Co. No. 5 Broussard & Hebert, H.&T.C. Sur. Drlg. shale and lime 5,150 ft.
Humble O. & R. Co. No. 3 Johnson, H.&T. C. Sur. T.D. 7,087 ft.; top sand 7,037 ft.; setting csg.
Humble O. & R. Co. No. 16 Middleton, sec. 58. Drlg. sand at 6,115 ft.
Humble O. & R. Co. No. 9 Tyrell, H.&T.C Sur. Drlg. shale 5,200 ft.
Humble O. & R. Co. No. 4 Zappe, H.T.& C. Sur. T.D. 7,088 ft.; top sand 7,036 ft.; running 7-in. csg.
Humble O. & R. Co. No. 10 White, James McGahay Sur. Drlg. shale 6,195 ft.
Sun Oil Co. No. 13 White, James McGahey Sur. T.D. 7,084 ft.; 7-in. csg. at 7,036 ft.
Sun Oil Co. No. 14 White, James McGahey Sur. T.D. 7,087 ft.; I.P. 28 B.P.H., ¼-in. choke; T.P. 1,100 lbs.; C.P. 1,200 lbs.
Sun Oil Co. No. 15 White J. McGahey Sur. Drk.
Sun Oil Co. No. 18 White, J. McGahey Sur. M.I.R.

Barbers Hill—Chambers County

Stanolind O. & G. Co.'s No. 29 Chambers Wm. Bloodgood Sur. Derrick.

Cotton Lake—Chambers County

Salt Dome Oil Co. No. 1 A. B. Lawrence, Solomon Barrow Sur. Abd. derrick.
Salt Dome Oil Co. No. 2 Lawrence. T.D. 7,003 ft.; P.B.; perforated csg. 6,650-54 ft.; tested salt water, same oil; abd.

Turtle Bay—Chambers County

Stanolind O. & G. Co. No. 2 Middleton, M. A. Carroll Sur. T.D. 6,609 ft.; 7-in. csg. at 6,597 ft.; screen sanded up: reset: tubing sanded up; pulled screen; cleaning out to bottom.
Stanolind O. & G. Co. No. 2 State. Drlg. shale 2,609 ft.

Big Creek—Fort Bend County

Gulf Oil Corp. No. 69 Davis, B. Young League. Drlg. surface 30 ft.

Blue Ridge—Fort Bend County

Alamo Drlg. Co. No. 1 Blakely, E. Drew Sur. Drlg. lime 2,230 ft.
Ben Barnett No. 2 Blakely, E. Drew Sur. Drlg. gumbo 1,554 ft.
H. G. Frost et al No. 1 Robinson, H. Shropshire Sur. R.U.
D. M. Wallace and Woodley Pet. Co. No. 2 Blakely, E. Drew Sur. T.D. 3,963 ft.; P.B. and drlg. to 3,911; 5-in. csg. at 3,860 ft.

Orchard—Fort Bend County

Gulf Prod. Co. No. 44 Moore, Leo Burknapp Sur. Sh. 6,020 ft.; P.B. 3,575 ft.; testing.
Gulf Oil Corp. No. 46 Moore, Leo Burknapp Sur. Drlg. shale and lime 1,187 ft.

Thompson—Fort Bend County

Naylor et al No. 8 Gehr, S. Kennedy Sur. Drlg. sand and shale 720 ft.
Sterling O. & R. Co. No. 1 F. I. Booth, H. Chrisman Sur. Drlg. sandy shale 5,372 ft.

High Island—Galveston County

Stanolind O. & G. Co. No. 5 B.&N.O., Fitzsimmons Sur. T.D. 6,477 ft.; P.B. 5,795 ft.; 7-in. csg. at 5,755 ft.; P.B. to 5,785 ft.; perf. 5,760-80 ft.; flowed 590 bbls fluid, 50 per cent S.W.; P.B. 5,530 ft.; set whipstock; drlg. shale 5,711 ft.
Stanolind O. & G. Co. No. 55 Cade, Wm Hudson Sur. T.D. 5,126 ft.; I.P. 310 B. P.D., ¼-in. choke; T.P. 900 lbs.
Stanolind O. & G. Co. No. 56 Cade, N. Fitzsimmons Sur. Drlg. shale 1,435 ft.
Stanolind O. & G. Co. No. 1 Cooper, M. Dunman Sur. Drlg. shale 1,200 ft.
Stanolind Oil & Gas Co. No. 18-B Smith Royalty, M. Dunman Sur. T.D. 5,529 ft.; P.B. 3,650 ft.; W.O.C.

Dickinson—Galveston County

Humble O. & R. Co. No. 3 E. E. Townes, J. S. Jones Sur. T.D. 8,045 ft.; 15-min. D.S.T. from 7,985-8,045 ft.; recovered 7 thribbles of clean oil, 7 thribbles of gas and oil, 28 thribbles of gas cut mud.
Humble O. & R. Co. No. 8-A Stewart, J. Sellers Sur. Derrick.
Humble O. & R. Co. No. 3-B Bayou Dev. Co., J. Sellers Sur. T.D. 232 ft.; 10¾-in. csg. at 212 ft.
Humble O. & R. Co. No. 7-B Stewart, John Sellers Sur. T.D. 8,035 ft.; top sand 8,015 ft.; running 7-in. csg.
Ken Ben Oil Co. No. 1 Stewart, W. K. Wilson Sur. Drlg. shale 7,210 ft.
Pure Oil Co. No. 3 Shelar, B.B.B.&C. Sur. T.D. 8,052 ft.; 7-in. csg. 8,025 ft.; swbd. fluid level at 3,000 ft.; 1,300 lbs. gas pressure; prep. to W.O.
Stanolind O. & G. Co. No. 4 State, Tr. No. 3. Drlg. shale and lime 5,365 ft.
Stanolind O. & G. Co. No. 5 State, Tract 3. Drlg. sandy lime 8,149 ft.

Batson—Hardin County

Nimrod Prod. Co. No. 1 Butler, W. Doneho Sur. Drlg. shale and lime 3,070 ft.

Saratoga—Hardin County

John Deering No. 1 Teel, Thomas Gaines Sur. Drlg. shale 4,250 ft.

Humble—Harris County

Texas Co. No. 272 Landslide, R. D. Usman Sur. T.D. 3,160 ft.; 7-in. csg. at 3,160 ft.; drlg. plug.

Mykawa—Harris County

West Prod. Co. No. 9 Irwin, W. B. Walker Sur. T.D. 4,985 ft.; P.B. and sdtkd.; drlg. shale 4,020 ft.
West Prod. Co. No. 1 Minnetex, Wm. Lovett Sur. Drlg. sand and lime 4,075 ft.

South Houston—Harris County

Smith & McDannald No. 1 Phillips, H.T. &B. Sur. No. 6. T.D. 4,780 ft.; 7-in. csg. at 4,640 ft.
Stanolind O. & G. Co. No. 1 Funk, Callahan & Vince Sur. Drlg. shale and lime at 4,059 ft.
Stanolind O. & G. Co. District No. 23, H. T.&B. Sur. No. 5. Drlg. shale 2,312 ft.
Stanolind O. & G. Co. No. 1 Schwartz, H.T.&B. Sur. No. 6. T.D. 4,775 ft.; reaming.
Stanolind O. & G. Co. No. 2 Schwartz, H. T.&B. Sur. 16-in. csg. at 90 ft.; W.O.C.
Stanolind O. & G. Co. No. 1 C. J. Wyndelts, H.T.&B. Sur. No. 6. R.U.

Tomball—Harris County

Humble O. & R. Co. No. 5 Holderrieth, C. N. Pillot Sur. Derrick.
Humble O. & R. Co. No. 2 Laird, C. N. Pillot Sur. T.D. 5,558 ft.; 7-in. csg. at 5,553 ft.; W.O.C.
Humble O. & R. Co. No. 2 Mahaffey, J. Pruitt Sur. T.D. 5,552 ft.; 7-in. csg. at 5,546 ft.; I.P. 15 B.P.H., ¼-in. choke; T.P. 550 lbs.; C.P. 850 lbs.
Humble O. & R. Co. No. 1 Wilson, Ralph Hubbard Sur. T.D. 5,575 ft.; I.P. 15 B. P.H., ¼-in. choke; T.P. 500 lbs.; C.P. 750 lbs.
Humble O. & R. Co. No. 10-B Quilter, A. Senschall Sur. Drlg. shale 4,026 ft.
Humble O. & R. Co. No. 1-B Tollman, J. House Sur. R.U.
Texas Co. No. 2 Sam Lewis, C. N. Pillot Sur. Derrick.

Amelia—Jefferson County

Humble O. & R. Co. No. 2 Guinn, C. Williams Sur. Drlg. shale 1,876 ft.
Humble O. & R. Co. No. 1 Pinkback, C. Williams Sur. Drlg. sand 6,768 ft.

Big Hill—Jefferson County

Stanolind O. & G. Co. No. 3-A Pipkin and Davis, Wm. McFaddin Sur. Drlg. lime 5,810 ft.

Fannett—Jefferson County

Gulf Oil Corp. No. 19 Thomas, W. H. Smith Sur. T.D. 5,557 ft.; preparing to pump.

Cleveland—Liberty County

Gulf Oil Corp. No. 15-C Cleveland, J. Pleasant Sur. Spudded.

Esperson—Liberty County

General Crude Oil Co. No. 15 Davis, D. L. Kokernot Sur. T.D. 3,588 ft.; 7-in. csg. at 3,573 ft.; I.P. 468 B.P.D., ¼-in. choke.
General Crude Oil Co. No. 27 Esperson, Kokernot Sur. T.D. 2,863 ft.; 7-in. csg. 2,854 ft.; W.O.C.

Hankamer—Liberty County

Gulf Oil Corp. No. 24 Boyd, Amos Allen Sur. T.D. 5,015 ft.; S.D.
Gulf Oil Corp. No. 6 Crow and Jacobs, H.T.&C. Sur. No. 21. T.D. 5,380 ft.; P.B. to 3,675 ft.; drilled to 3,940 ft.; pulling tubing.
Uscan Oil Co. No. 5 Exxell, Levi Borrow Sur. Drlg. shale 4,348 ft.

Hardin—Liberty County

Atlantic Oil & Prod. Co. et al No. 1 Hardy, James Robinson Sur. T.D. 8,110 ft.; D. S.T. made S.W.; P.B. 7,678 ft.; reset cmt.; will perforate csg. 7,700-10 ft.

Hull—Liberty County

Gulf Oil Corp. No. 26 Morris-Phillips, O. Underton Sur. Drlg. shale 4,075 ft.
Gulf Oil Corp. No. 112 Phoenix, J. Devore Sur. Drlg. gumbo 2,572 ft.
Republic-Houston No. 160 Dolbear, J. Devore Sur. M.I.R.

Markham—Matagorda County

Hamill & Hamill No. 1 Poor Boy Smith, H. Parker Sur. R.U.

Van Vleck—Matagorda County

Skelly Oil Co. No. 1 Langham, M. Cummings Sur. T.D. 7,505 ft.; perforated csg. from 7,460-75 ft. with four shots; testing.

Skelly Oil Co. No. 2 Metzler, M. Cummins Sur. Moving in.

Skelly Oil Co. No. 1 Rugeley, I.&G.N. Sur. No. 267. T.D. 7,053 ft.; reaming.

Skelly Oil Co. No. 6-B Kobb, M. Cummings Sur. T.D. 7,261 ft.; reaming.

Skelly Oil Co. No. 7-B Cobb, M. Cummings Sur. R.U.

Conroe—Montgomery County

Humble O. & R. Co. No. 79-A South Tex. Dev. Co., Theo. Slade Sur. T.D. 5,123 ft.; 7-in. csg. at 5,083 ft.; comp.; no gauge.

South Gulf Corp. No. 1 Brent, D. W. Collins Sur. Drlg. shale 4,000 ft.

Sun Oil Co. No. 26 Foster. T.D. 5,122 ft.; 7-in. csg. at 5,013 ft.; W.O.C.

Splendora—Montgomery County

Tide Water Oil Co.-Darby Pet. Co. No. 1 W. C. and Ella Corbett, Josiah Blackman Sur. Drlg. shale 3,754 ft.

Orange—Orange County

Texas Canadian Oil Co. No. 1 Bland, James Dyson Sur. Coring sand showing gas 7,099 ft.

Port Neches—Orange County

Texas Co. No. 6-B Polk, J. Beaumont Sur. T.D. 6,952 ft.; T.D. sdtkd. hole 4,966 ft.; drld. to 5,402 ft.; stuck pipe at 5,131 ft.; abd.

Livingston—Polk County

Hawkeye Pet. Co. No. 1 W. F. Harder, A. Viesca Sur. Derrick.

Greta—Refugio County

Hewitt & Daugherty No. 23 Lambert, Hardwick Sur. T.D. 5,919 ft.; 7-in. csg. 5,849 ft.; I.P. 40 B.P.H., ⅝-in. choke.

United Gas Co. No. 24 Lambert-Hardwick Sur. T.D. 5,873 ft.; perforating csg. 5,813-36 ft.

Refugio—Refugio County

D. & D. Oil Co. No. 3, Heard townsite. T.D. 4,330 ft.; fsg.

United Gas Co. No. 12 Fannie Heard, Refugio townsite. Drlg. shale 2,437 ft.

United Gas Co. No. 17 Fox Hews Survey. T.D. 6,259 ft.; 5-in. csg. 6,248 ft.; tested S.W.; recmtd.; P.B. to 4,995 ft.; comp. for gas well.

United Gas Co. No. 7 Ryalls, Refugio townsite. Drlg. shale 4,530 ft.

Tomoconnor—Refugio County

Quintana Pet. Co. No. 35-A Tom O'Connor, Swisher Sur. Drlg. shale 4,530 ft.

Quintana Pet. Co. No. 1-C Tom O'Connor, Carr & Connell Sur. Drlg. shale 5,330 ft.

Coletto Creek—Victoria County

American Liberty Oil Co. No. 4 Machalic R. Manchola Sur. Drlg. sand and shale 2,660 ft.

Keeran—Victoria County

Gulf Oil Corp. No. 8 Keeran, DeLeon Sur. Drlg. shale 5,678 ft.

Placedo—Victoria County

Barnsdall-Costa Oil Co. No. 4 Wheless, S.A.&M.G. Sur. No. 3. Drlg. shale 4,225 ft.

Barnsdall-Costa Oil Co. No. 2 Wright, S. A.&M.G. Sur. Drlg. shale 1,600 ft.

Benson & Jones No. 2 J. A. Janis, Wm. Rupley Sur. Drlg. shale 1,450 ft.

Crown Central Oil Co. No. 2 Gebrover, J. M. Bronson Sur. T.D. 4,770 ft.; running 7-in. csg.

Harrison & Abercrombie No. 1 L. O. Sturdevant, S.A.&M.G. Sur. T.D. 4,764 ft.; 7-in. csg. at 4,742 ft.; I.P. 17 B.P.H., ¼-in. choke; T.P. 1,500 lbs.

Harrison & Abercrombie No. 2 Sturdevant, S.A.&M.G. Sur. R.U.

Smith-Gulf No. 1-B Henderson and Pickering, S.A.&M.G. Sur. M.I.

Sun Oil Co. No. 2 Schneeder, Wm. Rupley Sur. T.D. 4,767 ft.; 7-in. csg. at 4,759 ft.; R.U. to pump.

Clay Creek—Washington County

Sun Oil Co. No. 1 H. Lauter, N. Clay Sur. Drlg. shale 4,578 ft.

Sun Oil Co. No. 7 H. Witt, J. F. Perry Sur. Drlg. shale 110 ft.

Louise—Wharton County

Pure Oil Co. No. 1 Cochran, M.&C. Sur., sec. 29. Drlg. shale 3,604 ft.

Pure Oil Co. No. 4 McIntyre, Morris-Cummings Sur. T.D. 5,155 ft.; 7-in. csg. at 5,138 ft.; drlg. plug.

Pickett Ridge—Wharton County

Adrian Moore No. 1 W. P. Wilbeck, J. Tele Foriner Sur. R.U.

Crown Central Pet. Co. No. 1 J. J. Rod, W.C.R.R. Sur. 10¾-in. csg. 983 ft.; drlg. shale 1,750 ft.

Texas Co. No. 2 Marek, George Reynolds Sur. Drlg. shale 5,383 ft.

Texas Co. No. 19-A Pierce, I.&G.N. Sur. No. 33. Drlg. shale, sandy lime 2,913 ft.

Texas Co. No. 20-A Pierce, I.&G.N. Sur. Drlg. gumbo 1,838 ft.

Texas Co. No. 21-A Pierce, I.&G.N. Sur. No. 38. R.U.

Withers—Wharton County

Texas Co. No. 1-B Pierce, E.T. R.R. Sur., Abst. No. 108. Drlg. shale and lime 6,-188 ft.

Texas Co. No. 5-C Pierce, C. J. Caldwell Sur. T.D. 5,567 ft.; 7-in. csg. at 5,555 ft.; I.P. 13 B.P.H., ¼-in. choke.

Texas Co. No. 6-C Pierce, J. Caldwell Sur. Drlg. shale and lime 1,874 ft.

Texas Co. No. 7-C Pierce, J. Caldwell Sur. Drk.

GULF COAST WILDCATS

Austin County

W. H. Mitchell et al No. 1 F. Fenner, J. Fitzgibbons Sur. M.I.M.

Brazoria County

Gulf Oil Corp. No. 1 Fairfield, A. Robinson Sur. T.D. 8,393 ft.; flowed gas, S.W., mud; killed well; cmtd. bottom 200 ft. of stuck drill stem and backed off at 5,900 ft.; prepare to sidetrack.

Strake Oil Corp. et al No. 1 D. K. Poole J. W. Hardin Sur. T.D. 6,731 ft.; hole clean to 4,731 ft.

Texas Co. No. 3 Freeport Sulphur Co., C. Areola Sur. Drlg. shale 4,323 ft.

Texas Gulf Prod. Co. No. 1 Sparks. Cored S.W. sand 6,327-37 ft.; drlg. ahead.

Chambers County

Glenn H. McCarthy No. 1 Pitt, J. M. Duran Sur. T.D. 7,538 ft.; reaming.

Calhoun County

Continental Oil Co. No. 1 T. Vandenberg, sec. 13, Blk. H. R.U.

Humble O. & R. Co. No. 2 Welder, Jose Maria Rios Sur. No. 1. T.D. 5,474 ft.; perforated 5,465-70 ft.; set 9 ft. of screen; flowed 95 per cent wash wtr, 5 per cent oil, ¼-in. choke; T.P. 950 lbs.; C.P. 1,350 lbs.

Colorado County

Terminal Oil Products Co. No. 1 R. S. Gillis, M. Middleton Sur. Drlg. shale 3,-892 ft.

Fayette County

Ben G. Barnett No. 1 McKinnon, A. Zumwalt Sur. Coring shale 3,437 ft.

Galveston County

Coastal Mineral Dev. Co. No. 1 Joslin, Sarah McKissick Sur. Abd. 6,505 ft.

Sun Oil Co. No. J. D. Hughes, W. M. C. Baker Sur. Drlg. shale at 9,318 ft.

Grimes County

Crook Bros. No. 1 W. W. and J. C. Greir. Drlg. shale 1,854 ft.

Hardin County

S. Hindman No. 1 Howth, A. J. Cotton Sur. S.D. 4,359 ft.

David B. MacDaniel No. 1 Nona Mills, E. E. Manvel Sur. Drlg. shale 6,907 ft.

Harris County

Amerada Pet. Corp. et al No. 1 Dopslout C.W.R.R. Sur., Blk. 1, sec. 2. Drlg. sh. 6,710 ft.

Bunte O. & G. Co. No. 1 Lobit et al, Benjamin Barrow Sur. Drk.

Jefferson County

Magnolia Pet. Co. No. 1 Funches, sec. 16, H.T.&B. Sur. Drlg. shale 7,967 ft.

McSpadden et al No. 1 Burrell estate. Derrick.

Sun Oil Co. No. 1 Herbert & Broussard B. Blackman Sur., Abst. No. 2. Drlg. shale 8,278 ft.

Matagorda County

John Deering No. 1 Estelle, Tone and Jameson Sur. T.D. 6,868 ft.; shot csg. 3,700 ft.

Heimerich & Payne, No. 1 Hawkins, D. McCarthy Sur. T.D. 7,816 ft.; P.B. to 3,503 ft.; set whipstock at 3,023 ft.; drlg. shale 3,382 ft. in sidetracked hole.

Sun Oil Co. No. 1 Craig, Thomas Williams Sur. T.D. 6,241 ft.; heaving shale.

Montgomery County

Chapman and Smith No. 1 Delta Land & Timber Co., T. Shepperd Sur. No. A-488. S.D. 4,980 ft.

Mid-Texas Oil Co. No. 1 Security Trust, G. W. Loonin Sur. Abd. 4,547 ft.

Orange County

Tide Water Oil Co. No. 1 E. N. Brown, Mary Latham Sur. Derrick.

Polk County

Dick Schwab No. 1-A Kirby Lbr. Co., T. A. Sublett Sur. 10¾-in. csg. 573 ft.

Tyler County

McArthur & Mixon No. 1 D. D. Kounts, J. A. Honkins Sur. Bldg. derrick.

Victoria County

Rowan-Hope No. 1 School, J. M. Escallera Sur. T.D. 6,057 ft.; abd.

Wharton County

Pure Oil Co. No. 1 Paige, James Pirie Sur T.D. 9,200 ft.; perf. 7,680-7,700 ft.; cutting 6⅝-in. csg.; washing down to test.

Smith & McDannald No. 1-A Priesmeyer, Charles Riley Sur. Bldg. derrick.

Sterling O. & R. Co. No. 1 Genzer-Jonathan Scott Sur. Drlg. shale 4,237 ft.

S. W. TEXAS WILDCATS

Aransas County

Buckingham Oil Co. No. 1 McCampbell, sec. 41-42, James Arids Sur. T.D. 7,591 ft.; recovering 6,200-ft. pipe.

Atascosa County

Atascosa Trust No. 1 Domsch, 160 ft. S line, 200 ft. E line, 152-ac. lease, J. T Russell Sur. 1,322. T.D. 3,519 ft.; set csg.; W.O.C.

Bee County

J. F. Haworth No. 1 Copeland, 330 ft. N line, 2,100 ft. E line, O. Marshall Sur. Drlg. 3,540 ft.

Howeth & Singer No. 1 Voss, 990 ft. NW line, 330 ft. SW line, S. May Sur. Loc.

Marine Oil Co. No. 1 Ray, 360 ft. E line, 330 ft. N line, 40-ac. tr., Anna Birkx Sur. No report.

Nichols & Quinn No. 1 Scott, Blk. 7, J. Molina Sur., Uranga grant. Loc.

Brooks County

California Co. No. 1 B. Garcia, 465 ft. N and W lines lease, B. Garcia tract, Salinas Sur. Coring 6,500 ft.

Duval County

Atlantic Oil Prod. Co. and Darby Pet. Corp. No. 1-F Welder, 2,310 ft. N and E lines, Sur. 552. S.D. 2,751 ft.

Conservative Oil Co. No. 1, D.C.R.C. Sur. 51, R.U.

C. G. Glasscock No. 1 Milano Land & Garden Co., Sur. 87, D.&A. at 3,400 ft.

Frank Gravis No. 1 C. K. Gravis, 1,650 ft SE line, 990 ft. SW line, Sur. 250. S.D. 5,040 ft.

Hamil & Smith No. 1 Hubbard, sec. 69. T.D. 3,020 ft.; D.&A.

Kepley Prod. Co. No. 1 Sevier, 330 ft. S line, 1,320 ft. E line, Sur. 71. T.D. 3,-410 ft.; P.B. 3,232 ft.; S.D.

Rio Bravo Oil Co. No. 1 Peters, 330 ft. S and E lines lse., Sur. 397. Sd. 1,807-12 ft.; S.O.&G. D.S.T.; 1,809-12 ft.; 80 ft. mud cut with oil and gas in 13 min.

Santa Clara Oil Co. (Atkins & O'Neil) No. 1 W. Serna, 330 ft. S and E lines, sec. 521. Drlg. 2,390 ft.

Texas Co. and Ohio Fuel Co. No. 2-B, D.C.R.C. Sur. 193. Loc.

Windsor Oil Co. No. 2 Peters, Sur. 33. R.U.

Edwards County

Paul Teas No. 1 Stewart, C SE¼ sec. 2, G.C.&S.F. Sur. S.D. 5,270 ft.

Guadalupe County

Paul Armstrong and J. E. Clark No. 1 Brodnaux, 150 ft. SE cor. 36-ac. tr., King Sur. D.&A. at 2,426 ft.

J. E. Clark No. 1 Anderson, Green De Witte Sur. Drlg. 2,013 ft.

J. E. Clark No. 1 Williams, DeWitte Sur. Cg. 2,390 ft.

Hidalgo County

Gerald O. & G. Co. No. 1 Nelson Mortgage Co., Blk. 38, Lot A, LaDonna Tr. Drlg. 4,400 ft.

Gulf States Oil Co. No. 3 John Engleman, Lot 3, Blk. 70. T.D. 6,758 ft.; W. O.C.; to test.

Helen K. Maxwell No. 1 Hidalgo Wtr. Dist. No. 2, Lot 11, Blk. 20, Alamo Land & Sugar Co. Subd., Alamo Tr. Perf. 650-56 ft.; bailing Wtr. S.O.

Quintana Petroleum Co. No. 1 John C. Engleman, Lot 10, Blk. 94, Las Mestanas grant. Coring 8,676 ft.

Dayle Smith No. 1 Fairbanks & Young, Blk. 44, Porc. 46. Cg. 1,856 ft.

Jim Hogg County

French Oil Co. No. 2 Rodrigues, Sh. 3, Sur. 579, ElReyoto grant. D.&A. 1,623 ft.

Theo. Hicks et al No. 1 Kohler, C W½ sec. 9, Novacitas grant. Loc.

Knode et al No. 1 Saunders, Sh. 3, Sur. 17, Las Animas grant. Drlg. sand and shale 821 ft.

S. L. Miller No. 2 Yeager, 777 ft. S line, 150 ft. E line, Blk. 6, Sur. 20. D.&A. 2,-550 ft.

Jim Wells County

Gist & Graddy No. 1 Owens, 660 ft. N line, midway E and W lines, Sur. 151. Spudded and S.D.

G. M. Richardson No. 1 Garrett, 1,980 ft. S line, 1,640 ft. E line, sec. 5. D.&A. 6,299 ft.

Karnes County

R. L. Barnett No. 1 fee, NE cor. 568-ac. tract. M.I.M.

DeGraffe & Reele No. 1 Cochran, 460 ft. E line, 160 ft. S line, McConnell League. Spudded in.

Kerr County

Auld & Evans No. 1 Heffner, 660 ft. N line, 330 ft. E line, sec. 13, U.R. 5,870 ft.

Eastland Oil Co. No. 7 Love, 660 ft. N Evans & Gant No. 1 Love, Martinez Sur. No. 1,594. T.D. 2,432 ft.; show S.W.

LaSalle County

Davenport & Talbott No. 1 Watkins, 1,-610 ft. S line, 330 ft. E line, Sur. 103. T.D. 2,700 ft.; S.D.

Paul Meader No. 1 Reed, sec. 136. Fsg. 2,790 ft.

Live Oak County

W. A. Brooks No. 1 Terrill, 1,000 ft. NE R.R., 1,500 ft. S line lse., Juan Houligan Sur. T.D. 1,080 ft.; S.D.

Dirks Bros. et al No. 1 Agnes Troell, 330 ft. SE and SW lines, 418-ac. tr., Thos. Pen Sur. D.&A. 3,931 ft.

Dirks Bros. No. 1 Geo. West Est., 1,361 ft. SE line, 340 ft. NE line, 80-ac. tract. M.I.M.

R. H. Feltner No. 1 J. T. Carter, 1,847 ft. NW line, 350 ft. NE line, 120-ac. tract, sec. 319. T.D. 3,466 ft.; drlg. in sdtrk. hole 2,880 ft.

Windsor Oil Co. No. 1 B. E. Stolte, con. tr., Wm. Kundy 3,690-ac. blk. Drk.

McMullen County

John F. Camp. No. 3 Byrne, 100-ac. tr., B. Odem Sur. T.D. 490 ft.; S.D.

Climax Oil Co. No. 1 Lark, 150 ft. S and W lines, Blk. 96, Scrugham Sur. Loc.

R. J. Hill No. 1 Richardson, Sur. 158. Set sur. csg.; T.D. 1,600 ft.; S.D.

Rainer Oil Co. No. 1 Hagist, 330 ft. S and W lines, SW¼, SE¼, Sur. 25. M.I.M.

Reliance Oil & Roy. Co. and Santa Clara Oil Co. No. 1 Shiner, 330 ft. N line, 150 ft. E line, NW¼, W½, sec. 30, Shumway Subd. Drk.

Swearingen & White No. 1 Lark Est., 152 ft. W line, 165 ft. S line tr., Scrugham Sur. T.D. 1,154 ft.; D.&A.

Nueces County

W. D. Hines No. 1 Flato, NW cor. Driscoll Townsite. Set surface csg.; W.O.C.

M. F. Hurlburt No. 1 Phillips, sec. 3, Flour Bluff Garden Tracts. Drlg. 5,-500 ft.

O. W. Killam No. 1 Ellick, 330 ft. N and E lines tr., sec. 109, Paul Subd. Set csg. 3,822 ft.; S.D.

Terminal Oil Prod. Co. No. 1 Thurman, 660 ft. N and W lines, SW¼, sec. 19. M.I. rig.

G. M. Richardson No. 1 Gerhardt, 660 ft. E line, 330 ft. N line, sec. 79. Drk.

Southern Minerals Corp. No. 2 Rand Morgan, 330 ft. N line, midway E and W lines, Lot 42, Roberts Subd., A.B.&M. Sur. 411. R.U.

San Patricio County

Benedum & Trees Oil Co. No. 1 Jones, 1,650 ft. E line, 990 ft. S line, NW¼ sec. 65. T.D. 6,270 ft.; stuck drill stem; washing.

Benedum & Trees Oil Co. No. 2 Welder, sec. 19. T.D. 6,116 ft.; set csg.; W.O.C.

C. B. Bunte No. 1 Mayfield, 121 ft. W line, 237 ft. N line, Tr. 11, Ross Subd. M.I.M.

Joe Lundins No. 1 Welder, 330 ft. N and W lines, sec. 30, Paul Subd. Spudded.

Potrero Oil Co. No. 1 Welder, 2,000 ft. N and W lines, sec. 37. T.D. 6,010 ft.; D.&A.

Willis Storm No. 1 Nancy Hobbs, 622 ft. NW and SW lines, 30-ac. tr. T.D. 7,-004 ft.; D.&A.

Starr County

J. F. Anderson No. 1 Ysagierre, Tr. 1, Porc. 79, J. of Camargo. Drlg. 830 ft.

Coreta Oil Co. No. 1 Pena, 150 ft. S and E lines, Sh. 30, Porc. 81. T.D. 1,500 ft.; S.D.

O. W. Killam No. 1 Sanford Ricaby, 330 ft. W line, Porc. 83, J. of Camargo, 300 ft. S of Highway 4. T.D. 1,500 ft.; S.D.

Larkin & Warr No. 1 Kelsey-Bass, 538 ft. N line, 408 ft. E line, Lot 8, Porc. 87. R.U.

Ed Leach No. 1 Wood Est., 300 ft. W line E 2/7, Porc. 84. S.D. 2,740 ft.

Porter Evans et al No. 1 Starr County Cattle Co., cen. Lot 14, Sh. 69, Porc. 89, J. of Camargo. Loc.

Webb County

Illinois Pet. Co. No. 1 J. H. Kirkpatrick, 330 ft. S and E lines, NW¼, Blk. 1, sec. 16. Loc.

Willacy County

M. E. Morton et al No. 1 Santa Rosa, 330 ft. N and E lines, Lot 12, Blk. 21, Santa Rosa Subd., Sh. 44. Loc.

Shell Pet. Corp. No. 1 Yturria Land & Cattle Co., 990 ft. S and E lines, Share 64, San Juan de Carricitos grant. Drlg. 4,874 ft.

Wilson County

A. G. Reimenschneider No. 2 L. Harrell, 750 ft. NE line, 2,300 ft. NW line, Barrera Sur. No report.

Zapata County

Oklahoma Co. No. 1 Sanchez, Sh. 9, Blk. 37, Sanchez ranch. Set sur. csg.; coring 3,032 ft.

O. J. Perren No. 1 Uribe, 330 ft. NE line, 227 ft. SE line, Blk. 31, Borrego grant. R.U.

Zavalla County

Bay Oil Co. No. 1 Calliant, sec. 43, A. B.&M. Sur. Drlg. sandy shale 4,316 ft.

W. L. Bridges No. 1 Price & Flowers, 1,-320 ft. N and W lines, Blk. 1, sec. 19. T.D. 450 ft.; S.D.

Frank Buttram No. 1 Whitecotton, 2,400 ft. N line, 300 ft. W line, A.B.&M. Sur. Drlg. sandy shale 4,223 ft.

Leona Oil Co. and Witherspoon Oil Co. No. 1 West, 330 ft. E line, midway N and S lines, sec. 1, Bustillo Sur. Drlg. 5,760 ft.

S. W. TEXAS PROVEN

Dirks—Bee County

Dirks Bros. and McMurray No. 3-B Harris, 200 ft. N line, 990 ft. W line, 61.9-ac. tr., J. L. Dugat Sur.; set whipstock 3,300 ft.; W.O.C.

Illinois Pet. Co. No. 1 C. E. Hahl, 990 ft. NW and NE lines, 320-ac. tr., H. W. Fontaine Sur. D.&A. 3,829 ft.

Sun Oil Co. No. 7 Page, 990 ft. SE and SW lines tr., Young Sur. Top sd. 3,519 ft.; set csg. 3,818 ft.; W.O.C.

Pettus—Bee County

United Prod. Co. No. 53 Ray, Thos. Hanson Sur., Abst. 173. Sd. 3,934-35 ft.; deepening.

Ray—Bee County

N. V. Duncan No. 3-A Campbell, B.&B. Sur., Abst. 139. R.U.

Alta Verde—Brooks County

Nordan, Morris & Nash No. 1 Singer, 495 ft. E line, 835 ft. S line, Sur. 312. Drlg. 759 ft.

Pedernal Oil Co. No. 1 Singer, 330 ft. S line, 280 ft. W line, NW¼, SW¼, Sur. 436. Fsg. 925 ft.

Salt Flat—Caldwell County

Chiquita Oil Co. No. 1 Hickman, G. Hinds Sur. T.D. 2,273 ft.; rmg. down.

Driscoll—Duval County

Continental Oil Co. No. 9-A Sevier, Sur. 23. Drlg. 1,975 ft.

Government Wells—Duval County

Magnolia Pet. Co. No. 2 Harrall, Sur. 64. R.U.
Morris Stein No. 1 Hahl, 160-ac. tract, Sur. 47. Spudded in.
J. T. Stover No. 1 Hester, 330 ft. S and E lines, SW¼, NE¼, Sur. 47. Drlg. 2,027 ft.

Hagist—Duval County

Marzo Oil Co. No. 3 Hagist, 660 ft. SW of No. 1, Sur. 6. S.D. 1,815 ft.

Hoffman—Duval County

Duval Oil Corp. No. 1 Hoffman, 990 ft. N line, 330 ft. NE line tr., Sur. 118. Sd. 2,875-80 ft.; swbg. in.
Duval Oil Corp. No. 3 Ruiz, 330 ft. S line, 990 ft. W line, sec. 119. Sd. 2,889-2,905 ft.; swbg. in.
W. D. Maston No. 1 Ruiz, Sur. 128. Set Sd. 2,889-96 ft.; W.O.C.
Plymouth Oil Co. No. 1-B Hoffman, 100-ac. tr., Sur. 118. Set csg. 2,875 ft.; comp.; no gauge; T.D. 2,889 ft.
Standard of Kansas No. 3 Hoffman, 80-ac. tr., Sur. 118. Cg. 2,880 ft.
Sun Oil Co. No. 1 Sutherland, Sur. 68 T.D. 2,761 ft.; set csg. 2,756 ft.; W.O.C.

N. Kohler—Duval County

Windsor Oil Co. No. 2 Peters, 2,304 ft. S line, 3,269 ft. E line, Sur. 33. Derrick.

Labbe—Duval County

Stanolind O. & G. Co. No. 4 Farmers Life Ins., Sur. 416. Tested gas 2,446-54 ft.; cg. 2,556 ft.

Loma Novia—Duval County

Bridwell Oil Co. No. 3-A Hubbard, sec. 71. Skidding on.
Bridwell Oil Co. No. 8-B Hubbard, Sur 75. Drlg. 2,467 ft.
Bridwell Oil Co. No. 9-C Hubbard, Sur. 75. Skidding on.
Duval Oil Corp. No. 14-B Moody, Sur. 60. Sd. 2,538-49 ft.; set csg. 2,537 ft.; drlg. plugs.
Highland Oil Co. No. 11 M. C. Hubbard, sec. 72. Drlg. 2,772 ft.
Highland Oil Co. No. 12 M. C. Hubbard, sec. 12. R.U.
Humble O. & R. Co. No. 52-B Hubbard, Sur. 72. Drlg. 1,530 ft.
Humble O. & R. Co. No. 35-B Hubbard, Sur. 72. Set csg.; W.O.C.; T.D. 2,720 ft.
Humble O. & R. Co. No. 45-B Hubbard, Sur. 72. Comp. 20.67 B.P.H. on ½-in. choke; T.D. 2,739 ft.
Humble O. & R. Co. No. 60-B Hubbard, Sur. 72. Sd. 2,745-62 ft.; comp. 17.23 B. P.H. on pump.
Humble O. & R. Co. No. 1-C Hubbard, Sur. 72. Cg. sh. 2,430 ft.
Humble O. & R. Co. No. 11 Ruiz, Sur. 553. Comp. 9.66 B.P.H. on ½-in. choke; T.D. 2,781 ft.
Humble O. & R. Co. No. 10 Vela, N½ Sur. 42. Drlg. sh. 480 ft.
Kaffie Lbr. Co. No. 1 Davidson, NW¼, Sur. 114. Tstg. 2,564 ft.
Magnolia Pet. Co. No. 30 Hahl, Sur. 67. Derrick.
Magnolia Pet. Co. No. 33 Hahl, Sur. 67. Comp. 20 B.P.H.; T.D. 2,615 ft.
Magnolia Pet. Co. No. 34 Hahl, Sur. 67. Running liner; T.D. 2,640 ft.
Reynosa Oil Co. No. 3-A Davidson, NE¼, Sur. 114. Drlg. 2,120 ft.
Rodney DeLange No 4 DuVon, Sur. 76. R.U.
Rosan Texla Oil Co. No. 14 Hubbard, Sur. 84. R.U.
Shell Pet. Corp. No. 1 Bishop, Sur. 59. T.D. 2,555 ft.; set csg. 2,540 ft.; W.O.C.
Shell Pet. Corp. No. 32 Hubbard, E½, Sur. 77. Prep. run tubing 2,752 ft.
Texas Co. No. 36 Wendt. Sur. 68. T.D. 2,806 ft.; comp. 15 B.P.H.
Texas Co. No. 29 Wendt, Sur. 68. Drlg. under sur. csg.
Texas Co. No. 38 Wendt, Sur. 68. T.D. 2,816 ft.; comp. 14 B.P.H.
Texas Co. No. 39 Wendt, Sur. 68. Top sd. 2,680 ft.; set csg.; W.O.C.
Texas Co. No. 14 B.C.C., Sur. 59. Sd. 2,530-36 ft.; W.O.C.
Valley Osage Oil Co. No. 5 Hubbard, Sur. 75. Comp. 12 B.P.H. on ½-in. choke; T.D. 2,615 ft.
Valley Osage Oil Co. No. 6 M. C. Hubbard, Sur. 75. Drlg. 2,450 ft.

Loma Vista—Duval County

Atlantic Oil Prod. Co. No. 1 J. F. Welder hrs., 330 ft. N and E lines, 160-ac. tr., Sur. 103. D.S.T. 2,726-51 ft.; gas and 170 ft. drlg. mud cut with gas; prep. second D.S.T.
Shell Pet. Corp No. 1-A Welder, 330 ft. N line, 900 ft. W line lse., Sur. 103. T.D. 2,277 ft.; plugged; skidding for new hole.
Shell Pet. Corp. No. 1-A Welder, 1,040 ft. W line, 330 ft. N line lease, Sur. 103 (new hole). Set sur. csg.; W.O.C.

Piedra Lumbre—Duval County

Humble O. & R. Co. No. 2-B D.C.R.C., N½ NE¼, Sur. 95. Cg. sh. 1,945 ft.
Magnolia Pet. Co. No. 3 D.C.R.C., NW¼, Sur. 95. Skidded over 75 ft.; R.U.
Texas Co. No. 17 D.C.R.C., SW¼, Sur. 100. Drlg. 1,586 ft.

Seven Sisters—Duval County

Atlantic Oil Prod. Co. No. 6-D Welder, Sur. 113. T.D. 2,492 ft.; comp. 15 B.P.H.
Atlantic Oil Prod. Co. No. 10-D Welder. Sur. 113. Set csg. 2,206 ft.; sd. 2,192-2,205 ft.; comp.; no gauge.
Atlantic Oil Prod. Co. No. 10-D Welder, Sur. 113. Set csg. 2,206 ft.; W.O.C.
Atlantic Oil Prod. Co. No. 11-D Welder, Sur. 113. T.D. 2,486 ft.; comp. 216 B. P.D. on ¼-in. choke.
Atlantic Oil Prod. Co. No. 12-D Welder, Sur. 113. Set csg. 2,488 ft.; W.O.C.
Atlantic Oil Prod. Co. No. 1-G Welder, Sur. 102. R.U.
Buchanan & Blanco Oil Co. No. 12 Welder. 75 ft. S No. 7, Sur. 591. Cg. 2,195 ft
Buchanan & Blanco Oil Co. No. 8-B Welder. 990 ft. W line, 330 ft. N line, S½, NW¼, Sur. 591. T.D. 2,525 ft.; comp.; no gauge.
S. B. Cloyes No. 1 Serna, 330 ft. N and E lines tr., Sur. 384. Loc.
Dulce Oil Co. No. 2-B Serna. Sur. 384. T.D. 2,210 ft.; comp. 19 B.P.H.
Dulce Oil Co. No. 3-B Serna, SE¼, Sur. 384. Set csg. 2,179 ft.; W.O.C.
Humble O. & R. Co. No. 10 Smith, Sur. 384. T.D. 2,463 ft.; flowing in stg.
Humble O. & R. Co. No. 13-A Serna, SW¼, Sur. 384. Set sur. csg.; W.O.C.
Humble O. & R. Co. No. 16-A Serna, Sur. 384. T.D. 2,500 ft.; comp. 27.6 B.P.H. on ½-in. choke.
Humble O. & R. Co. No. 8-B Serna, Sur. 384. T.D. 2,484 ft.; comp. 21.45 B.P.H.
Humble O. & R. Co. No. 9-B Serna, Sur. 384. Cg. 2,460 ft.
Humble O. & R. Co. No. 4 Wright, Sur. 118. T.D. 2,509 ft.; rng. tbg.
Navarro Oil Co. No. 2 Welder, Sur. 383. Sd. 2,445-47 ft.; comp. 840 B.P.D.
Parr Oil Co. No. 3 Welder, Sur. 383. T.D. 2,456 ft.; comp. est. 100 B.P.D.
Relience & Kleiner No. 6 Welder, Sur 381. Sd. 2,393-2,417 ft.; comp. 20 B.P.H.
Relience Oil & Roy. Co. and Henderson & Harvey No. 1 Drummond, 330 ft. S and E lines, Sur. 308. T.D. 2,000 ft.; abd.
Reliance Oil & Royalty Co. and Henderson & Harvey No. 1 Drummond (new hole), 330 ft. S and E lines, Sur. 308. Sd. 2,525-38 ft.; D.S.T. 1,300 ft. oil in 10 min.; set csg.; W.O.C.
Relience Oil & Royalty Co. No. 2-A Telford, Sur. 386. Sd. 2,671-92 ft.; recmtg.
Santa Clara Oil Co. No. 2-B Welder, Sur. 383. Sd. 2,474-85 ft.; rng. tbg.
Santa Clara Oil Co. No. 10-D Welder, Sur. 383. T.D. 2,441 ft.; set csg. 2,426 ft.; W.O.C.
Shell Pet. Corp. No. 7-A Welder, Sur. 385. T.D. 2,468 ft.; set csg. 2,160 ft.; W.O.C.
Westheimer & Daube No. 9 Campos, Sur. 224. Sd. 2,199-2,218 ft.; comp.; no gauge.
Westheimer & Daube No. 10 Campos, Sur. 224. Drlg. 2,014 ft.

Pearsall—Frio County

Amerada Pet. Corp. No. 1 Correy & McWilliams, 660 ft. N line, 721 ft. W line, Tr. 17, Manuel Tijerina Sur No. 300. T.D. 5,676 ft.; comp. 22 B.P.H.
Amerada Pet. Corp. No. 6 Halff & Oppenheimer, 466 ft. S and W lines, S. A. Ditch Co., Sur. No. 1,104. Skidding on to rework.
Amerada Pet. Corp. No. 7 Halff & Oppenheimer. 1,320 ft. W line, 330 ft. S line, J. H. Gibson Sur. No. 16. T.D. 3,926 ft.; P.B. 3,910 ft.; W.O. tools.
Amerada Pet. Corp. No. 2 Smith, 466 ft. E line, 2,771 ft. N line tr., J. V. Mason Sur. Drlg. 3,877 ft.
Combs & Oakes No. 1 Arp, 330 ft. S and E lines. 102-ac. tr., S. Blair Sur. 297. Drlg. 1,836 ft.

North Pettus—Goliad County

Jane Oil Co. No. 2 Lackey & Welder, 660 ft. SE of No. 1, J. Gomez Sur.; sd. 3,678-86 ft.; set csg. 3,677 ft.; testing.
Jane Oil Co. No. 9 Mudd, B.&B. Sur. 25. T.D. sd. 3,701 ft.; set csg.: W.O.C.
Magnolia Pet. Co. No. 1 Weldon, J. Gomez Sur. Set csg. 3,687 ft.; swbg. in.
Sun Oil Co. No. 6 Scarborough, E. Talley Sur. R.U.
H. H. Weinert No. 2 Lackey & Welden, 423 ft. SE line, 257 ft. NE line, J. Gomez Sur. Drlg. 3,029 ft.

Clark—Guadalupe County

Eickenroth & Gallagher No. 1 Johns, 130 ft. E line, 450 ft. N line, 840-ac. tr., DeWitt Sur. 13. Drlg. 2,923 ft.

Mercedes—Hidalgo County

Union Sulphur Co. No. 7 American Rio Grande L. & I. Co., 4,000 ft. SE of No. 1 Farm, Tr. 2,309, Blk. 59. Jetting 7,446-49 ft. with gas.
Union Sulphur Co. No. 8 American Rio Grande L. & I. Co., 660 ft. N & E lines Tr. 2,120, Blk. 87. Cg. sh. 7,822 ft.
Union Sulphur Co. No. 9 American Rio Grande L. & I. Co., Farm Tr. 2,275, Blk. 59. Cg. sh. 6,597 ft.

Samfordyce—Hidalgo County

J. H. Anderson No. 5 Guerra, Tr. 254, Porc. 40. S.D. 1,270 ft.
Dean Bros. No. 1 Lula George, 150 ft. S line, 230 ft. W line 10-ac tract. Tract 13, Porc. 40. Sd. 2,748-52 ft.; comp. 50 B.P.D. on 3/32-in. choke.
Navarro Oil Co. No. 3 F. B. Guerra, Share 12, Porc. 41. Spudded.
Weekly Oil Corp. No. 1 George, Tr. 13, Porc. 41. Drlg. 2,321 ft.

Bentonville—Jim Wells County

La Jita Corp. No. 1 Pope, 660 ft. S and E lines, sec. 20, King Farm Lots. Loc.
Stanolind O. & G. Co. No. 1 Raney, 330 ft. N and E lines, sec. 16. M.I.M.
Stanolind O. & G. Co. No. 1 Sain, 330 ft. S and W lines, sec. 18. R.U.
Texon and Lucey No. 1 Dodd, 330 ft. S and E lines, sec. 15, R. King Farm Lots Subd. Set sur. csg. 600 ft.; W.O.C.

Sandia—Jim Wells County

J. E. Walsh No. 2 Wade, Lot 2, Blk. "C," Bode Subd. T.D. 1,500 ft.; S.D. for fuel.

San Diego—Jim Wells County

Houston Oil Co. No. 1 Hawkins & Wallace, 990 ft. S and E lines, Blk. 11. Recmtd. through perforations 2,957-61 ft.; W.O.C.

Calliham—McMullen County

Wilkerson & Lightfoot No. 7 Lark, 510 ft. N line, 150 ft. E line, Blk. 113, Scrugham Sur. Comp. 52 B.P.D.; sd. 1,031-38 ft.

Loma Alta—McMullen County

V. G. Schimmel No. 1 Hagist, 330 ft. N and E lines, SW¼, Sur. 108. Cg. 1,916 ft.

King—Nueces County

La Jita Oil Corp. No. 2 King, 660 ft. N and W lines, sec. 24. Drlg. 5,733 ft.

Saxet Heights—Nueces County

Bartlett & Reed No. 1 Carson, SW cor., 20-ac. tr., Villareal Sur. Set csg. 4,126 ft.; perf. 4,078-84 ft.; made gas; reworking.
Capitol Oils, Inc., No. 1 L. Ayres, cen. 5-ac. tr., Villareal Sur. Sd. 4,069-80 ft.; reworking.
Capitol Oils, Inc. No. 1 Gravis, 2.86-ac. tr., Blk. 11, Bancroft Farm Lots. Derrick.
Cherokee Oil Co. No. 1 Groescher, Villareal Sur. Set sur. csg.; W.O.C.
Cherokee Oil Co. No. 1 Holder, 5-ac. tr., Villareal Sur. Sd. 4,071-75 ft.; W.O.C.
Corpus Christi Ref. Corp. No. 1 fee, 333 ft. S line, midway E and W lines, 12.16-ac. tr., J. H. Sigler Sur. W.O.C. 510 ft.
J. K. Culton No. 6 Baldwin, Blk. 20, J. C. Russell Farm tr. T.D. 1,300 ft.; gas sd.; P.B. and abd.
J. K. Culton No. 6 Whelan, 82.38-ac. tr., Villareal Sur. Comp. est. 200 B.P.D. T.D. 4,105 ft.
Tom Graham No. 1 City of Corpus Christi, C 5-ac. tr., Villareal Sur. Comp. 110 B.P.D.; T.D. 4,050 ft.
Tom Graham No. 1 Kaiser, Villareal Sur. T.D. 4,077 ft.; rng. tbg.
Graham & Roberts No. 3 Carver, 142.8 ft. E line, 200 ft. N line, 4.04-ac. tr., Blk. 4, Ellendale Gardens No. 2. Cg. 4,060 ft.
Graham & Roberts No. 1 Curry, Villareal Sur. Sd. 4,080-85 ft.; brought in as gasser; reperforating 4,073-77 ft.
Graham & Duncan No. 1-A Priour, Villareal Sur. Set csg. 500 ft.; W.O.C.
D. H. Hawn No. 1 Priour, 5-ac. tr., Oak Park Addn. Sd. 4,067-75 ft.; set csg.; W.O.C.
Johnson et al No. 1 Cowles, 160 ft. W line, 75 ft. S line tr. T.D. 3,500 ft.; fsg.
Johnston et al No. 1 Werner, Blks. 11, 12, Ellendale Gardens No. 1. Set csg. 4,081 ft.; W.O.C.
Port O. & G. Co. No. 1 Country Club, C Lot 20, Villareal Sur. Perforated 4,080-85 ft.; cleaning.
Port Oil & Gas Co. No. 4 Country Club, Lot 20, Villareal Sur. M.I.M.
Port Oil & Gas Co. No. 1 Gibson, cen. 1.25-ac. tr., Blk. B, Harbor View. Addn. R.U.
Republic Nat. Gas Co. No. 4-B Baldwin, 790 ft. SE of No. 2, 330 ft. NE line, Blk. 19. T.D. 4,100 ft.; comp. 60 B.P.D.
W. A. Richardson No. 2 Edwards, 10-ac. tr., Villareal Sur. Drk.
Hiram Reed No. 1 Quinn, Villareal Sur. T.D. 4,117 ft.; flowing in pits.
J. B. Salmon No. 1 Clark, Blk. 4, Oaklawn Subd. T.D. 4,076 ft.; jetting.
Taylor Ref. Co. No. 4 Corpus Christi Golf and Country Club, 83-ac. tr., Villareal Sur. Set csg. 4,080 ft.; W.O.C.
Taylor Ref. Co. No. 2 Corpus Christi Country Club, 250 ft. SW line, 1,005 ft. SE line, 73-ac. tr. W.O.C. 500 ft.
Wilson Drlg. Co. No. 1 Starr, 125 ft. NW line, 150 ft. SW line, 3.39-ac. tr., Blk. 11, Bancroft Farm Lots. R.U.

Saxet—Nueces County

Paul Benedum No. 1 Page Bros. (workover), 330 ft. N and E lines, S 50 acres, 104-ac. tr., Sh. 2, Frank Subd. Drk.
Conroe Drlg. Co. No. 1 Frank Bliss, W 80-ac. tr., J. W. Stevens Sur. No. 406. Drlg. 5,457 ft.
Conroe Drlg. Co. No. 1 Rand Morgan, 330 ft. N line, 990 ft. E line lease, Sur. 403. Drk.
Great States Oil Co. No. 1 Smith, 330 ft. W line, 125 ft. N line, 11-ac. tr. Spdd.
W. B. Hinton No. 1 E. B. Cole, 60-ac. tr., Villareal Sur., Cg. 4,722 ft.
A. F. Holliday No. 2 Griffith, 347 ft. W of No. 1, G. Frank Sur. 416. Cg. 4,116 ft.
A. F. Holliday No. 3 Hutchins, sec. 30. Drlg. 4,277 ft.
Houston Oil Co. No. 3 Harrell, Blk. 19, Sheppard Farm Lots. Sd. 4,861-68 ft.; set csg. 4,861 ft.; W.O.C.
Houston Oil Co. No. 11 Rand Morgan, sec. 7, Rge. 5. Set sur. csg. 184 ft.; W.O.C.
Morgan Gulf Oil Co. No. 3 Rand Morgan, 990 ft. N line, 330 ft. E line, Sur. 403. Set sur. csg.; W.O.C.
Morgan Gulf Oil Co. and Great States Oil Co. No. 1 Humphreys, 330 ft. S line, 990 ft. W line, Stevens Sur. 406. Drlg. 2,511 ft.
Morgan Gulf Oil Co. and Great States No. 1-B Rand Morgan, B.S.&F. Sur. 404. Cg. 3,956 ft.
Maryland Corp. and R. M. Hutchins No. 1 Gonzales, cen. Blk. 8, Clarkwood Townsite. Set sur. csg.; W.O.C.
Phillips Pet. Co. No. 3 Hutchins, 330 ft. N and W lines, Blk. 19, Sheppard Farm Lots. Drk.
Renwar Oil Co. No. 1 Morgan, sec. 315. Sd. 4,421-25 ft.; drlg. plugs.
W. A. Richardson No. 1 W. S. Hutchins (workover), 330 ft. S and E lines, 80-ac. tr., Sh. 2, Frank Sur. 416. T.D. 5,000 ft.; M.I.M.
W. A. Richardson No. 1 Smith, C Blk. 4, Clarkewood townsite. Spudded in.
W. A. Richardson No. 3 Meredith, Lot 11, Clarkwood townsite. Sd. 4,403-23 ft.; comp. est. 200 B.P.D.
W. A. Richardson No. 4 Meredith, cen. Blk. 9, Clarkwood Townsite. M.I.M.
Richardson et al No. 3 Sedwick, Sur. 586. Sd. 4,543-57 ft.; set csg. 4,549 ft.; swbg. in.
Shell Pet. Corp. No. 3 Flato, 330 ft. E and S lines lease, 40-ac. tr., I. Dunn Sur. M.I.M.
Southern Minerals Corp. No. 2 Rand Morgan, Blk. 42, Roberts Subd. R.U.
Southern Minerals Corp. No. 4 Bliss, Sur. 406. Drlg. 3,745 ft.
Southern Minerals Corp. No. 1 Isensee, C. Land Sur. 404. Spdg. in.
Southern Minerals Corp. No. 4 Isensee, SE cor. 235-ac. tr., C. Land Sur. 404. Sd. 4,387-4,404 ft.; comp.; no gauge.
Southern Minerals Corp. No. 1 Mastin, G. Frank Sur. 416. Sd. 5,803-21 ft.
Southern Minerals Corp. No. 5 Smith, Blk. 4, H. B. Sheppard Farm Lots. Drlg. 1,150 ft.
Texon Royalty Co. No. 1 McElroy, 115 ft. N line, 100 ft. W line, 40-ac. tr., Gallagher Sur. D.S. stuck 4,100 ft.; stdg.

Plymouth—San Patricio County

Humble O. & R. Co. No. 1 Bevly, 466 ft. N and W lines tr., Blk. 8, sec. 35, Taft Sub. perf. 5,635-49 ft.; comp. 3.88 B.P.H. on 9/64-in. choke.
Humble O. & R. Co. No. 2 Bevly, 466 ft. N line, 315 ft. E line, Blk. 8, Sur. 35. Skidding drk.
Magnolia Pet. Co. No. 7 Corpus Christi Bank, 932 ft. E of No. 6, sec. 24. T.D. 5,884 ft.; D.S.T. 960 ft. oil in 10 min.; 75 lbs. W.P.; W.O.C.
Plymouth Oil Co. No. 43-C Welder, 2,046 ft. S line, 2,355 ft. W line, sec. 49. T.D. 5,650 ft.; comp. 108 B.P.D.
Plymouth Oil Co. No. 45-C Welder, 1,138 ft. S line, 2,522 ft. W line, sec. 49. T.D. 5,640 ft.; comp. 268 B.P.D.
Plymouth Oil Co. No. 46-C Welder, 659 ft. S line, 1,507 ft. E line, sec. 49. T.D. 5,645 ft.; comp.; no gauge.
Plymouth Oil Co. No. 47-C Welder, 2,187 ft. S line, 1,433 ft. W line, sec. 49. M.I.M.
Sun Oil Co. No. 7 Hunt, 466 ft. S and E lines, Lot 5, sec. 34, Taft Farm Lands Subd. R.U.
Texon Roy. Co. No. 1 Rambo, 330 ft. W line, 466 ft. N line, Lot 6, sec. 35. T.D. 5,653 ft.; flowing 125 bbls. in 14 hrs. on 5/32-in. choke; completing.

Taft Field—San Patricio County

Esnes Oil Co. No. 3 Britton, 990 ft. N line, 330 ft. W line, 160-ac. tr., sec. 5, Blk. 7. Set csg. 4,009 ft.; W.O.C.; sd. 4,005-19 ft.
Humble O. & R. Co. No. 2 Mayo, 1,323 ft. S line, 1,152 ft. E line tr., Tabor Sur. Sd. 3,964-75 ft.; set csg. 3,964 ft.; W.O.C.
Shell Pet. Corp. No. 1 Pullin, Blk. 4, sec. 1. T.D. 4,915 ft.; comp. 27 B.P.H., ¼-in. choke; sd. 4,915-20 ft.

Margo—Starr County

H. L. Curry No. 1 Garcia, 30-ac. tr., Sh. 7-B, Porc. 70, J. of Mier. No report.
St. Marys O. & G. Co. No. 1 O'Shea, 450 ft. N line, 935 ft. W line, Sh. 65, Porc. 71. S.D. 697 ft.

Samfordyce—Starr County

E. A. Graham No. 1 Santos Villareal, 26.48-ac. tr., Tr. 250, Porc. 38. Sd. 3,032-42 ft.; D.S.T.
Phillips and Barnsdall No. 10 Yturria Land & Cattle Co., 110-ac. tr., E½, Porc. 100. Drlg. 2,120 ft.
Porter & Grimes No. 2 Garcia Land & Livestock Co., Lot 1, W½, Porc. 100. M.I.M.
Skelly Oil Co. No. 12 Seabury, 10-ac. tr., Tr. 256, Porc. 38. Cg. 2,776 ft.
Sun Oil Co. No. 3 Chapatola, 660 ft. N, 330 ft. W No. 2, Porc. 99. R.U.

Aviator—Webb County

Five Spot Drlg. Co. No. 1 Bruni, Blk. 44, Albercas grant. Sd. 1,677-80 ft.; drlg. plugs.

Lopez—Webb County

Hunter Oil Co. No. 1-A Billings, Sur. 113. T.D. 2,220 ft.; comp. 3,000,000 ft. gas.
C. H. Lewis No. 6 Lopez, sec. 110. Set csg. 31 ft.; W.O.C.
Mills Bennett Prod. Co. No. 8 Garcia, Sur. 112. Comp. 528 B.P.D.; T.D. 2,211 ft.
Mills Bennett Prod. Co. No. 9 Garcia, Sur. 112. Comp. 22 B.P.H.; T.D. 2,209 ft.
Mills Bennett Prod. Co. No. 9 Montemayor, Sur. 114. Comp. 22 B.P.H.; T.D. 2,206 ft.
Mortimer & Springer No. 8 M. Lopez, sec. 114. Cg. 2,180 ft.
Superior Oil Co. No. 7-A Billings, 990 ft. S line, 2,310 ft. E line, Sur. 113. Sd. 2,207-35 ft.; Set csg.; W.O.C.

O'Hern—Webb County

Magnolia Pet. Co. No. 13 Seacord-Benavides, Hale Subd., Arispe grant. Comp. 75 B.P.D.; T.D. 2,906 ft.
Magnolia Pet. Co. No. 14 Seacord-Benavides, cen. Blk. 427. M.I.M.
Magnolia Pet. Co. No. 9-B Benavides, Hale Subd., Arispe grant. Comp.; no gauge; T.D. 2,834 ft.
Magnolia Pet. Co. No. 10-B Servando-Benavides, Blk. 426. M.I.M.
J. J. O'Hern No. 1 S. Benavides, Blk. 460. Drlg. 1,466 ft.
T. S. Reed No. 3 Brennan-Benavides, Blk. 317. Set csg. 2,892 ft.; drlg. in.
Texla Oil Corp. No. 2-D Benavides, Hale Subd., Arispe grant. Sd. 2,864-88 ft.; set csg.; W.O.C.

Escobas—Zapata County

B. W. Roscoe No. 4 Bustamante, Share 33. Sd. 1,380-88 ft.; testing.
S.R.C. Oil Co. No. 17-A Trevino, Sur. 66. Sd. 1,302-34 ft.; comp. 20 B.P.D.

Texas Co. No. 89 Whitehead, Cerrito Blanco grant. Drlg. 1,431 ft.

Haynes—Zapata County

Geo. Buck No. 1 Haynes, Blk. 4, Alice D. Haynes Subd. R.U.

Clover O. & G. Co. No. 13 Haynes, Blk. 7. Drlg. 857 ft.; comp. 30 B.P.D.

Upchurch & McKay No. 1 Haynes, Blk. 7, Haynes Subd. Cg. 922 ft.

WEST TEXAS WILDCATS

Andrews County

Grisham-Hunter Oil Corp. No. 1 Ratliff & Bedford, sec. 24, Blk. 73, P.S.L. Sur. Machine.

Humble O. & R. Co. No. 1 J. M. Spinks, sec. 13, Blk. A-20, T.D. 4,550 ft.; on test.

Brewster County

F. C. Dodson No. 1 Texas American Synd., sec. 66, Blk. 10, G.H.&S.A. Sur. Drlg. 1,860 ft.

Cochran County

Cascade and Honolulu Oil Corp. No. 1 E. B. Duggan, cen. Labour 13, League 55 Oldham County School Land. T.D. 232 ft.; waiting on rotary.

Concho County

W. C. Nelson et al No. 1 Rice, sec. 13, H.&T.C. Sur. S.D. 1,650 ft.

Crane County

Clark et al No. 1 A. P. Jordan, sec. 12 Blk. B-22, P.S.L. Sur. Machine.

Gulf Oil Corp. No. 2 W. N. Waddell, sec. 18, Blk. B-21, Drlg. 2,100 ft.

Gulf O. Corp. No. 2 Tubbs, 440 ft. N and E. sec. 12, Blk. 27-B. Drlg. 1,506 ft.

Humble O. & R. Co. No. 2 Tubbs, sec. 11 Blk. B-27, S.D. 4,375 ft.; to Schlumberger test.

Loffland Bros. No. 2 Tubbs, sec. 9, B-27, Drk.

Moore Bros. No. 1 Barnsley, sec. 43, Blk. 32, P.S.L. Sur. Drlg. 4,119 ft.

Rider et al No. 1 Thaxton, sec. 2, W. L. Wilkenson Sur. Spudded and S.D.

Sinclair Prairie Oil Co. et al No. 1 Tubbs sec. 3, Blk. B-27, Drlg. 4,322 ft.

L. R. Stroud No. 1 Moseley, S.D. 1,901 ft.

Crockett County

John I. Moore No. 1 A. C. Hoover, sec. 4, Blk. FF, B.&B. Sur. Drlg. 936 ft.

Ector County

W. Dunning, Jr., No. 1 H. E. Cummins, sec. 33, Blk. 45, Twp. 1n, T.&P. Sur. Drlg. 4,235 ft.

Grisham-Hunter Corp. No. 1 R. B. Cowden, C of SE¼, sec. 10, Blk. 45, Twp. 2n, T.&P. Sur. Cellar.

Edwards County

Paul Teas No. 1 J. B. Stewart, sec. 2, Blk. DA, G.C.&S.F. Sur. S.D. 5,290 ft.

Fisher County

Forest Dev. Co. No. 1 A. M. Dry, sec. 108, Blk. 2, H.&T.C. Sur. T.D. 3,110 ft.; ran 3-in. to test.

Gaines County

Landreth Prod. Co. No. 1 Kirk, sec. 23, A-21. Drlg. 3,956 ft.

Garza County

Brown Eagle Oil Co. No. 1 Sullivan, Blk. 5, K. Aycock Sur. Spudder.

M. L. Richards No. 1 U. U. Post Est., 2,310 ft. from S and E. sec. 1,232, D. L. Phillips Sur. Loc.

Glasscock County

Bruce Frazier No. 1 E. Patterson, 330 ft. N and E. sec. 188, Blk. 29, W. & N.W. T.D. 190 ft.; R.U.R.

M. B. Stanton et al No. 1 W. P. Edwards, sec. 11, Blk. 34, Twp. 2s, T.&R. Sur. Drlg. 770 ft.

Howard County

Southern Oil Co. No. 1 W.P. Edwards, sec. 33, Blk. 30, Twp. 1s, T.&P. Sur. Drlg. 2,910 ft.

D. C. Reed et al No. 1 Walter Pike, sec. 24, Blk. 33, Twp. 1n, T.&P. Sur. Drlg. 1,954 ft.

Hudspeth County

Haymon Krupp Oil & Land Co No. 1 Thaxton sec. 34 Blk. 74, Twp. 6, T.&P. Sur. Drlg. 659 ft.

Jeff Davis County

C. M. Joiner No. 1 Jones & Coffield, sec. 8, Blk. 3, H.&T.C. Sur. Drlg. 3,875 ft.

Jones County

Gyr & Davis No. 1 Clyburn, E. H. Millard Sur., Sub. 27. Spudded.

T. D. Humphrey No. 1 J. M. Radford, 1,-sec. 19, Blk. 16, T.&P. Sur. Drlg. 2,367 ft.

Parker No. 1 C. L. Brown, sec. 9, Blk. 2, T.&N.O. Sur. T.D. 1,894 ft.; U.R. cag.

Menard County

Wilcox O. & G. Co. No. 1 Merchenson, sec. 158, E.L.R.R. Sur., Abst. 1,840, 8 miles S of Menard. S.D. 2,400 ft.

Pecos County

Dobbs Oil Co. No. 1 Rooney, sec. 12, Blk. 125, T.&St.L. Sur. Drlg. 1,580 ft.

S. Thompson No. 1 Elsinore Cattle Co., sec. 54, Blk. D, G.C.&S.F. Sur. Drlg. 2,512 ft.

Trans-Pecos Oil Co. No. 1 F. W. Popham sec. 235, Blk. 11, G.H.&S.F. Sur. Drlg. 575 ft.

Presidio County

Linderman Bros. Oil Corp. No. 1 J. R. Bledsoe & Badgley, sec. 15, Blk. 351, G.C.&S.F. R.R. Co. Sur., 2½ mil. NE of Presidio. T.D. 1,635 ft.

Reagan County

Bahan & Rhodes No. 1 M. Chase, sec. 40, Blk. 36, Twp. 5s, T.&P. Sur. Drlg. 3,-105 ft.

Schleicher County

Cardinal Oil Co. et al No. 1 J. A. Whitten, sec. 35, Blk. LL, T.C.R.R. Sur. S.D. 4,222 ft.

Magnus Oil Co. No. 1 Judkins & Spencer, C SW¼ sec. 4, Blk. V-28, Elev 2,209 ft.; S.D. 4,350 ft.; gas sd. 4,956-5,-ft.; drlg. 5,500 ft.

Terry County

J. A. Estes No. 1 F. B. Graham, 1,650 ft. from S and 990 ft. from W, sec. 23, Blk. T, O.&W.R.R. Loc.

Tom Green County

Spinner No. 1 Reed, Sub. 39, Mason & Perry Sur. S.D. 2,035 ft.

Ward County

Gulf Oil Corp. No. 1 W. A. Estes, sec. 38, Blk. 34, H.&T.C. Sur. Drlg. 1,327 ft.

P. Moran et al No. 1 Reynolds, sec. 12, Blk. 5, H.&T.C. R.U. machine.

Peck et al No. 2 Reynolds, sec. 12, Blk. 32, H.&T.C. Sur. S.D. 90 ft.

Superior Oil Co. No. 1 J. H. Hughes, sec. 67, Blk. 34, H.&T.C. Sur. S.D. 2,400 ft.

Winkler County

Bert Fields et al No. 1 Pure-Clapp, sec. 26, Blk. 26, T.D. 3,035 ft.; shot; tstg.

R. H. Henderson et al No. 1 J. B. Walton, sec. 10, Blk. 26, T.D. 3,045 ft.; swbg. and C.O.

Herbert Oil Co. No. 1 I. Hendrick, sec. 14, Blk. 26, C.O. 2,770 ft.

Humble O. & R. Co. No. 2-C Walton, sec. 34, Blk. 74, P.S.L. Sur. Drlg. 2,700 ft.

Magnolia Pet. Co. No. 1 State-Walton, sec. 7, Blk. B-3, T.D. 3,695 ft.; P.B. 3,171 ft.; tstg. on pump.

Fred Hyer No. 1 Evans, sec. 8, Blk. 56, S.D. 4,150 ft.

Joiner No. 1 Evans, sec. 46, Blk. 73, P.S.L. Sur. S.D. 3,335 ft.

Read & Duffey No. 1 Sealey, sec. 8, Blk. A, G.M.M.B.&A. Sur. Loc.

Wahlenmaier and Atlantic Oil Prod. C No. 1-A Walton, sec. 34, Blk. 74, T.D. 3,000 ft.; to shoot.

Yoakum County

Bahan et al No. 1 Henard, C SW ¼, sec. 367, Blk. D, J. H. Gibson Sur. S.D. 140 ft.

Stogner et al No. 1 Roosevelt, 2,230 ft. from N and 330 ft. from E, sec. 216 Blk. D, John H. Gibson Sur. T.D. 140 ft. R.U. rotary.

TEX. PANHANDLE WILDCATS

Gray County

Bell O. & G. Co. No. 2 Furneaux, sec. 102, Blk. B-2, H.&G.N. Sur. Drk.

Joana Oil Corp. No. 1 Rendleman, sec. 146, Blk. B-2, H.&G.N. Sur. Drlg. 2,-528 ft.

K. Kinsey No. 1 Stephens, sec. 187, Blk sec. 546, Blk. H, B-2, H.&G.N. Sur. T.D. 2,475 feet, fishing tools.

Hartley County

O. V. Beck et al No. 1-A Matador Ranch sec. 20, Blk. 22, C.S.S. Sur. Pipe stuck 4,600 ft. and S.D.

Hutchinson County

Phillips Pet. Co. No. 1 Bryan, sec. 6, Blk M-21, T.C. Ry. Sur. T.D. 3,061 ft., pay 2,990-3,060 ft.; swbd. 150 bbls. in 10 hrs.

Harry Stekall No. 1 Erle Thompson, 330 ft. from N and E lines, E½ sec. 5, Blk. M-18, D.P. Sur. Drlg. 315 ft.

L. L. Travis et al No. 1 Hodges, sec. 14 Blk. X-02, H.O.&B. Sur. T.D. 3,082 ft.; putting on pump.

Moore County

Moran Bros. No. 1 Lucky Tiger Oil Co., 330 ft. from S and E lines, SE¼ sec. 5, Blk. 1, P.D. Sur. Spdg.

Shamrock O. & G. Co. No. 1 Ryan-Jones sec. 190, Blk. 3-T, T.&N.O. Sur. Deepened to 3,495 ft. and P.B. to 3,461 ft.; tested 21 bbls. oil and wtr. in 24 hrs.

Wheeler County

Allender & Heare No. 1 Harvey, sec. 67, Blk. 13, H.&G.N. Sur. T.D. 2,187 ft.; fsg.

Ben G. Barnett No. 1 Stewart, sec. 73, Blk. 13, H.&G.N. Sur. S.D. 2,136 ft.

Johnston et al No. 1 Rabo, sec. 105, Blk. 23, H.&G.N. Sur. Spudded and S.D.

Phillips Pet. Co. No. 1 Porter, sec. 35, Blk. A-8, H.&G.N. Sur. T.D. 3,235 ft., wtr. broke in after cmtg. 10-in. cag.; now recmtg.

E. C. TEXAS WILDCATS

Anderson County

Gulf Oil Corp No. 1 Ross, 1,770 ft. from SW and 1,370 ft. from NW of Robt. Irwin Sur. T.D. 5,476 ft.; elev. 487 ft.; washing.

Angelina County

G. E. Ginter No. 1 Martin Wagon Works, E. Evans Sur., 2 mi. W of Homer. Spdd.

Bill La Rue No. 1 Cameron Lbr. Co., I. Ray Sur. Top sd. 1,340 ft.; S.D. 1,354 ft.

Bowie County

Westmount Oil Co. No. 1 R. N. Phillips, 1,700 ft. E and 230 ft. S of G. N. Hancock Sur., 10 mi. N of Oak Grove. Drk.

Woodley Pet. Co. No. 1 Lumpkin, S.D. 3,260 ft.

Cherokee County

Humble O. & R. Co. No. 1 S. D. Goodson, W. I. Reynolds Sur., 4 mi. SW of Jacksonville. Elev. 428 ft.; Austin 4,552-4,-764 ft.; cg. 4,830 ft.

Fannin County

Carter, Trustee, No. 1 Galloway. Drlg. 2,-236 ft.

Franklin County

Lucey Pet. Co. No. 19 W. Crawford, O. James Sur. Elev. 371 ft.; top Paluxy 4,-139 ft.; Georgetown 3,407-35 ft.; set pipe 4,034 ft.

Grayson County

Olson Drlg. Co. No. 1 Southwestern Life Ins. Co., J. C. Jamison Sur. 6 miles NW of Denison. Elev. 767 ft. Top Viola 4,-901 ft.; T.D. 5,890 ft.; P.B. to 5,538 ft.; S.D.

P. A. Shaver No. 1 Wm. Blair, 10 ft. from Cook County line, R. H. Deavers Sur., 1½ mi. SW of Tioga. S.D. 89 ft.

Henderson County

McDougal et al No. 1 E. Price, M. Mathews Sur., 4 mi. S of Trinidad. Rig.

Kaufman County

Scott & Woodside No. 1 Robinson, A. Cherino Sur., 2 mi. W of Scurry. S.D. 800 ft.

Lamar County

J. Forrester et al No. 1 J. E. Woodward, but in J. W. Woodward Sur., 1 mi. E of Mintel. Top Paluxy 3,060 ft.; elev. 402 ft.; S.D. 4,516 ft.

North Texas Synd. No. 1 Haynes & McCuistion, A. W. Wright Sur., 4 mi. NE of Garrett Bluff. Georgetown 275-738 ft.; top Paluxy 739 ft.; S.D. 1,930 ft.

Limestone County

E. H. Daugherty No. 1 S. Welch, A. Varella Sur., 4 mi. W of Groesbeck. T.D. 3,131 ft.; R.U. to deepen.

C. L. Lytle No. 1 J. L. Thompson, P. Varella Sur., Mexia field. T.D. 6,080 ft.; tstg.

Navarro County

E. A. Thomason No. 2 Estes Bros., Wm. Gilbert Sur., 1,000 ft. E of No. 1, 1 mi. E of Roane. Drk.

Red River County

Abercrombie-Harrison No. 1 Temple Lbr. Co., D. D. Bruton Sur., 10 mi. NE of Clarksville. Drlg. 438 ft.

Williams et al No. 1 L. and O. Roberts, James Bankston Sur., 2 miles NE of Annona. Elev. 396 ft.; S.D. 725 ft.

Rusk County

McCallum et al No. 1 E. C. Gary, John Piburn Sur., 5 miles S of Henderson. Elev. 338 ft.; S.D. 3,750 ft.

Pure Oil Co. No. 1 W. H. Faulkner, Wm. Elliott Sur., S of Concord. Elev. 563 ft. top Georgetown 3,450 ft.; drlg. 5,100 ft.

Titus County

Jule Alford No. 2 Fry, I. P. Stern Sur., 1,-313 ft. N of No. 1. Drk.

Humble O. & R. Co. No. 1 M. B. Groves, Ben Jones Sur. Cut fault at 1,442 ft.; top Woodbine 3,240 ft.; S.D. 4,492 ft.

Magnolia No. 1 Carr, M. V. Delgado Sur. Elev. 371 ft.; T.D. 4,151 ft.; bailing mud.

H. C. Morrison No. 1 L. Sanders, C of Lot 1, Blk. 30, Talco townsite. Drk.

Ownby Drlg. Co. et al No. 1 F. Jones, C Lot 6, Blk. 16, M. V. Delgado Sur. Drlg. 1,302 ft.

Saunders et al No. 1 Talco School Dist., I. P. Stern Sur. Drlg. 2,052 ft.

Tide Water Oil Co. No. 1 Carr, 990 ft. N and 330 ft. W of 75-ac. lse., M. V. Delgado Sur. Drk.

Van Zandt County

A. W. Walker et al No. 1 C. M. Whitaker, 1,480 ft. S and 2,280 ft. W of T. Buckley Sur., 2 mi. N of Grand Saline. Loc.

EAST TEXAS

(Border Counties)

Cass County

American Liberty Oil Co. No. 1 Marcus Rembo, J. H. Reeves Sur. P.B. 6,072 ft. to 6,010 ft.; cmtd. 7-in. csg. at 5,993 ft.

American Liberty Oil Co. No. 2 Maxie, John Collum Sur. Drlg. 5,511 ft.

American Liberty Oil Co. No. 3 Maxie, John Collum Sur. Drlg. 5,047 ft.

McElvane et al No. 1 Beckett, John Collum Sur. Drlg. 4,752 ft.

R. W. Norton No. 2 Haywood, Priscilla Evans Sur. Drlg. 4,752 ft.

R. W. Norton No. 2 Mary Rives, John Collum Sur. Cg. 6,003 ft.

Texas Co. No. 1 E. E. Hall, James Young Sur. Drlg. 4,088 ft.

United Gas Pub. Ser. Co. No. 1 Eva Fields, John Collum Sur. Drlg. 4,586 ft.

United Gas Pub. Ser. Co. No. 2 Eva Fields, John Collum Sur. Drlg. 3,745 ft.

American Liberty No. 4 Maxie, J. Collum Sur. Drlg. 200 ft.

United Gas Pub. Ser. Co. No. 1 L. J. Cunningham, W. Robinson Sur. Loc.

United No. 3 Fields, J. Collum Sur. Drlg. 3,210 ft.

United No. 1 Simpson, 660 ft. N of Texas Co. No. 1 Hall, J. Young Sur. W.O.C. 321 ft.

United No. 1 J. J. Stewart, J. Collum Sur. Drlg. 3,667 ft.

Harrison County

S. C. Payne et al's No. 1 Lowery, H. D. Spain Sur. P.B. to 3,524 ft.

Marion County

Ed S. Holman's No. 1 Henderson, R. Bennington Sur. P.B. to 2,443 ft.

Panola County

George Hudson et al's No. 1 J. F. Nail & McGeary Sur. Set 8-in. 40 ft.; fshg. for core bbl. at 2,345 ft.

Geo. Le Grand No. 1 P. J. Wardleigh, A. Thompson Sur. Set 10-in. 62 ft.

N. C. TEXAS WILDCATS

Archer County

Continental Oil Co. No. 1 Claud Cowan, Blk. 6, J.C.S.L. Loc.

Continental Oil Co. No. 1 J. J. Perkins Lot 47, Blk. 5, C.&P. Sur. Drlg. 988 ft.

Deep Oil Dev. et al No. 1 Wilson, sec. 76, A.T.N.C. lands, W.O.C. 2,226-34 ft.; P.B. to S.O. wtr.

Luther Hedrick No. 1 Mrs. C. Threet, Blk. 91, J.C.S.L. Loc.

Harry Hines No. 1 J. J. Perkins, Blk. 51, B.C.S.L. Loc.

W. T. Hutcheson, Jr., No. 1 Wilson-C, Blk. 121, A.T.N.C.L. Loc.

Kemp & Waggoner No. 1 Wilson, Blk. 75, A.T.N.C.L. Loc.

Perkins & Cullum No. 1 Young, sec. 27, Harris. Drlg. 1,470 ft.

Riner & Massee No. 1 Wilson, Blk. 118, A.T.N.C.L. Drlg. 195 ft.

Baylor County

Consolidated Oil Co. No. 1 Portwood BB, T.E.&L. Sur. No. 1,573. O.S. 1,376-79 ft.; W.O.C.; drlg. plug.

K. R. March No. 1 W. B. Self, A. Hines A.-156.

Cooke County

Anderson & Kerr No. 1 C. A. Steiner, T. B. Stroud Sur. No. A-950. S.D. 2,000 ft.

Anderson & Kerr No. 1 A. Wilson, Strong Sur. A-930. Drlg. 2,004 ft.

Cain & Chandler No. 1 J. B. Burch J. McWilliams Sur. A-658. Drlg. 1,065 ft.

Joe Grazier No. 1 E. P. Bell, F. J. Lindheimer Sur. A-571. Loc.

Hardin Oil Co. No. 1 J. G. Bonner, J. Lindheimer Sur. S.D. 2,150 ft.

B. H. Hilburn No. 1 Hugan, A. Myers Sur. No. A-640. Drlg. 726 ft.

Keil & Keil No. 1 J. J. Perkins, B.B.B.&C. Sur. A-164. Drlg. 980 ft.

Lanier et al No. 1 Thetford, S.P.R.R. Sur. A-987. Drlg. 1,573 ft.

F. W. Merrick, Inc., No. 1 L. P. Bell, J. S. Martin Sur. A-699. Drlg. 2,180 ft.

N. Newburn No. 1 Dotson, Wm. Campbell Sur. A-238. Drlg. 1,700 ft.

Nixon Bros. No. 1 W. R. Harper, W. W. Pettit Sur. A-812. Material.

Petroleum Producers No. 1 J. W. Mount J. C. Meeks Sur. A-758. T.D. 1,730 ft.; est. 25 bbls. on pump.

E. R. Robison No. 1 J. Krebs, H. Wilkey Sur. A-1,090. Drk.

W. F. Russell No. 1 Belle Payne Marshall University Sur. A-620. Drlg. 1,429 ft.

J. M. Russell et al No. 1 B. B. Bawley, Blk. 24, John Barnett Sur. Drlg. 1,000 ft.

Seitz, Comegys & Seitz No. 1 Field & Bowers, L. Raney Sur. A-878. Spudded.

Sunray Oil Co. et al No. 1-A A. C. McCall, W. H. White Sur. A-1,134. S.D. 4,-720 ft.

B. F. Thompson No. 1 F. Truhenback, P. Davidson Sur. A-337. S.D. 765 ft.

Whitehead et al No. 1 W. Reed, F. Earthman Sur. A-349. Drlg. 795 ft.

Woodbine Oil Co. No. 1 Potter & Potter, J. Gorham Sur. Drlg. 997 ft.

Denton County

Oil Finance Corp. No. 1 J. S. Gambill, T. Burress Sur. S.D. 1,042 ft.

C. S. Hoad No. 1 Travelers Insurance Co., Wm. A. Thompson Sur. A-1,238. S.D. 857 ft.

Manning & Moore No. 1 E. L. Darnell, I. Walters Sur. A-1,329. Spudded.

Foard County

Humble O. & R. Co. No. 1 Burnett, sec. 16, Blk. X, S.P.R.R. Sur. Fishing 3,210 ft.

Jack County

Bryson Oil & Gas Co. No. 1 G. E. Evett, Geo. Hardesty Sur. A-294. S.D. 4,115 ft.; repairs.

S. B. Edwards No. 1 Bryson, J. Hughson Sur. A-256. R.U.R.

Engineers Oil Co. No. 1 Cooke, J. Young Sur. Drlg. 2,380 ft.

W. H. Hammon No. 1 G. E. Evett, H. Plaster Sur. Drlg. 750 ft.

W. H. Hammon et al No. 1 F. H. Rhodes, R. N. Erwin Sur. A-1,378. Drlg. 1,700 ft.

Harper Pet. Corp. No. 1 Van Hooser, J. W. Morrow Sur. A-1,926. S.D. 1,400 ft.; on dope.

C. Kadane No. 1 E. F. Smith, S.P.R.R. Sur. A-552. S.D. 1,295 ft.; repairs.

Panhandle Ref. Co. No. 1 Klinglesmith, M. Hamilton Sur. A-262. Sd. 3,040-50 ft.; C.O. after shot.

Sterntexas Oil Co. No. 1 Boyd, J. N. Wright Sur. A-898. S.D. 3,340 ft.

Montague County

E. T. Hart No. 1 W. L. Davis, sec. 13, Jack Co. School Lds. Drk.

Jim Seeds et al No. 1 Coombs, sec. 58, M.E.P.&P. Sur. Drlg. 1,708 ft.

J. M. Holmes No. 1 H. D. Field, sec. 55, M.E.P.&P. Sur. A-528. S.D.

A. H. Rosenburger No. 1 C. O. Meador, J. English Sur. A-214. R.U.R.

Southwest Pet. Co. No. 1 W. S. Petty, S. A. Southerlin Sur. A-992. Spud. and S.D.

Wichita County

Pete Harmon et al No. 1 J. B. Jamison. J. Deck Sur. A-52. Drlg. 600 ft.
Reno Oil Co. No. 1 W. T. Waggoner-D sec. 1, S.&M. Sur. A-393. Drlg. 1,576 ft.

Wilbarger County

Franklin Oil Co. No. 1 D. G. Feller et al. sec. 108, Blk. 14, H.&T.C. Sur. S.D. 1,570 ft.
Lane & Simons No. 1 Allison, sec. 43, H. &T.C. Sur., Blk. 12. Drlg. 1,710 ft.
Pois & Schultz No. 1 W. T. Waggoner, sec. 103, H.&T.C. Sur., Blk. 14. Drlg. 1,570 ft.
Smith No. 1 S. A. Dill et al, sec. 32, Blk 14, H.&T.C. Sur. S.D. 2,090 ft.
L. Webb No. 1 J. L. McCrary, sec. 64, H.& T.C. Sur., Blk. 14. Drlg. 1,900 ft.

Young County

Curtis & Bracken No. 1 Allar Co., H Garmes Sur. A-104. P.B. to 3,800 ft.; fsg. tbg.; flowing 5 B.P.H.
Hinson Tidwell No. 1 Thompson. Drlg. 200 ft.
C. D. Neff et al No. 1 W. A. Dennis. C. F Bass Sur. Drlg. 3,655 ft.
Pitzer West et al No. 1 W. R. Dollins, T.E. &L. Sur. 615. Drk.
Pitzer & West No. 1 Harrell, J. Daily Sur. A-78. Drlg. 3,770 ft.
Rathke Oil Co. No. 2 J. T. Rogers, S. H. Graham Sur. A-124. Drlg. 4,390 ft.
Roy Weggener No. 1 J. W. Davis, T.E.& L. Sur. 752. S.D. 320 ft.
Texas Co. No. 1 Stephens, T.E.&L. 1,985. Drlg. 1,685 ft.

Gas Field Operations in N. Y.-Penn.

COUDERSPORT, Pa., May 18.—The number of new locations staked is the only feature in the New York-Pennsylvania gas fields activity for the week ending May 16. Godfrey L. Cabot made a location on the Guy Thompson farm, Genesee Township, Potter County, and Potter Development Co. staked a location on the Crawford estate property, Keating Township, same county. In New York Chautauqua Southwestern Development Co. has a location on the E. G. Smith farm, Hanover Township, Chautauqua County. Natural Gas Producers is drilling at 550 feet on the Eddy farm, Rome Township, Oneida County. Property Shares is drilling at 488 feet on the Charles Hooper farm, same township and county. Wittmer Oil & Gas Co. is rigging up on the Raymond Cline farm, Amity Township, Allegany County.

Pennsylvania Operations

New York State Natural Gas Co. was drilling at 3,570 feet on the D. Rapan farm, Genesee Township, Potter County. Godfrey L. Cabot was moving in on the Theodore Cobb farm, same township and county. Sylvania Corp. was drilling at 1,625 feet on the George McCutcheon farm, Harrison Township, same county. New York State was drilling at 2,275 feet on the F. Whitney farm, Bingham Township, same county. Sylvania Corp. was idle at its location on the J. Steadman farm, Genesee Township, same county. William Snee and others were idle on the Summit Hotel property, South Union Township, Fayette County, with the hole at 6,272 feet. H. C. Drilling Co. was spudding at 75 feet on the Lesser & Louner farm, Kinzua Township, Warren County. Cowanesque Gas was drilling at 1,900 feet on the George Stebbins farm, Clymer Township, Tioga County. New York State was drilling at 320 feet on the Otto Burnside farm, same township. Godfrey L. Cabot was spudding at 25 feet on the J. L. Lattimer farm, same township.

New York Operations

Belmont Quadrangle Development Co. was drilling at 4,964 feet on the J. O'Hara farm, Willing Township, Allegany County. Cunningham Natural Gas was drilling at 4,355 feet on the same farm. Schrack and others were drilling at 3,705 feet on the Markey estate, same township. G. L. Cabot was moving in on the Lee Harder farm, Alma Township, same county. Utica Natural Gas was shut down at 875 feet on the William Grimm farm, Western Township, Oneida County. Belmont was drilling at 2,520 feet on the J. A. Brown farm, Leon Township, Cattaraugus County. Farriman and others were drilling at 850 feet on the Cash Willis farm, Howard Township. Carpenter and others were drilling at 1,239 feet on the C. Mattoon farm, Avoca Township, Steuben County. Ross and others were shut down at 436 feet on G. Wright farm, Portland Township, Chautauqua County.

Rocky Mountain Runs

Estimated daily average production for the week ending May 16 follows:

WYOMING

	Bbls.
Salt Creek	16,650
Big Muddy	1,550
Badger Basin	40
Byron	1,600
Dallas Derby	570
Dutton Creek	50
Elk Basin	300
Ferris	10
Frannie	2,830
Grass Creek	880
Hamilton Dome	2,160
Hudson	260
Hidden Dome	100
LaBarge	1,080
Lance Creek	3,410
Lost Soldier	1,040
Midway	60
Oregon Basin	1,550
Osage	540
Pilot Butte	20
Quealy Dome	90
Rock River	2,230
Poison Spider	120
Teapot	20
Warm Springs	170
Total Wyoming	37,330

MONTANA

Buckley-Border	220
Cat Creek	630
Cut Bank	7,740
Dry Creek	430
Kevin-Sunburst	4,310
Lake Basin	50
Pondera	830
Total Montana	14,210

COLORADO

Florence	180
Fort Collins and Wellington	350
Iles Dome	3,270
Moffat	470
Orchard	30
Rangely	80
Tow Creek	190
Total Colorado	4,570

NEW MEXICO

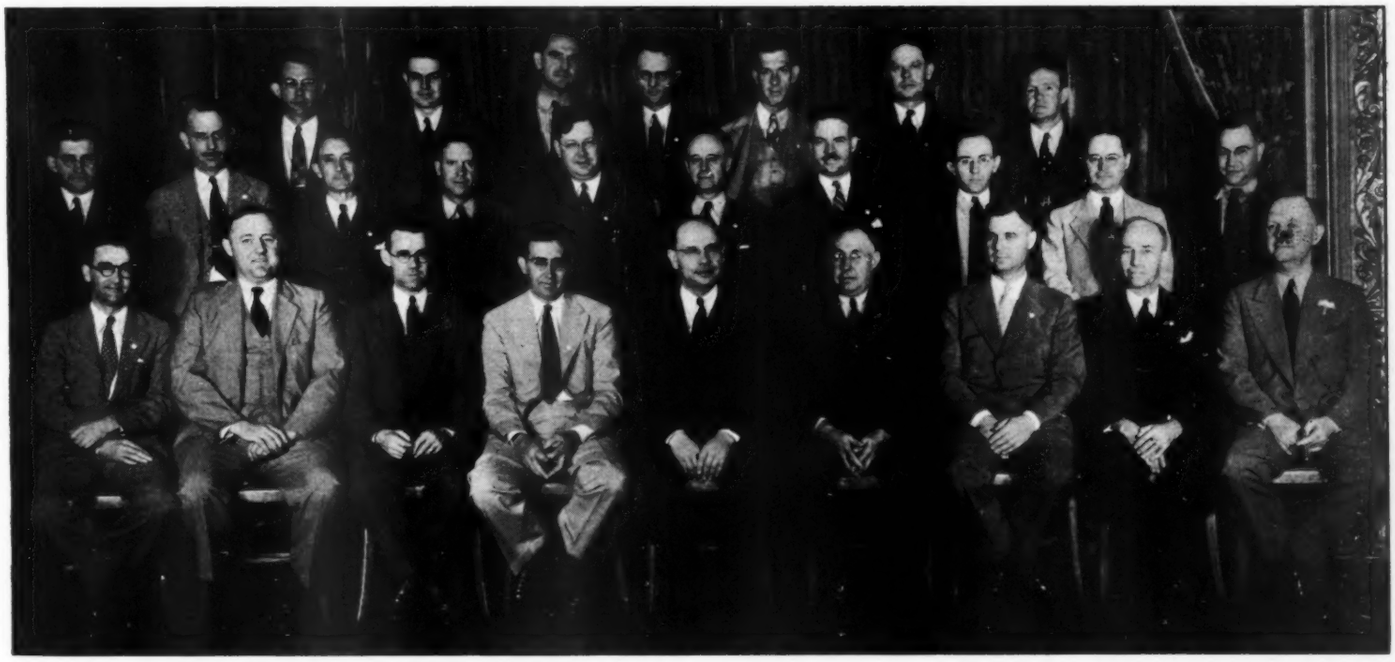
Artesia	650
Cooper area	8,150
Eunice	17,960
Hobbs	26,340
Hogback	200
Jal	3,110
Lea area	1,000
Maljamar	1,930
Monument	6,480
Rattlesnake	720
Table Mesa	90
Total New Mexico	66,630
Total Rocky Mountain region	122,740

Crude Stocks

Stocks of domestic and foreign crude at the close of the week ending May 2 totaled 314,192,000 bbls., according to the Bureau of Mines, an increase of 1,060,000 bbls., comprising an increase of 1,184,000 bbls. in stocks of domestic crude, but a decrease of 124,000 bbls. in stocks of foreign crude.

Grade of crude—	April 25	May 2
Pennsylvania Grade	4,161,000	4,261,000
Other Appalachian	918,000	905,000
Lima-N.E. Ind.-Mich.	1,286,000	1,326,000
Ill.-S.W. Indiana	10,536,000	10,468,000
N. La. and Arkansas, W. Texas and S.E. New Mexico	28,754,000	29,157,000
East Texas	20,678,000	20,562,000
Other Mid-Continent	127,573,000	127,819,000
Gulf Coast	27,048,000	27,444,000
Rocky Mountain	26,438,000	26,381,000
California	35,396,000	35,500,000
Foreign	3,416,000	3,292,000
Ttl. reported wkly.	296,332,000	297,342,000
Estimate of unreported stocks	16,800,000	16,850,000
Total stocks	313,132,000	314,192,000

MEMBERS AND REPRESENTATIVES OF NATURAL GASOLINE SUPPLY MEN'S ASSOCIATION



Back row, left to right: D. A. Leach, Chicago Bridge & Iron Works; Don Larson, Chicago Bridge & Iron Works; George Reid, Refiner & Natural Gasoline Manufacturing; Arch L. Foster, National Petroleum News; C. W. Wood, Mason-Neilan Regulator Co.; Paul C. Wallack, Mattison Wallack & Co.; B. W. Vinson, Vinson Supply Co. Middle row, left to right: C. D. Peterson, Fisher Governor Co.; J. H. Satterwhite, Westcott & Greis, Inc.; L. S. Allen, National Tank Co.; J. C. Scheidel, North American Car Corp.; E. Klappenbach, The Oil and Gas Journal; A. V. B. Candler, National Supply Co.; D. E. Fields, Tulsa Boiler and Machinery Corp.; H. F. Goodenough, The Refinery Supply Co.; R. T. Roberts, Goulds Pumps, Inc.; C. A. Mathey, C. A. Mathey Machine Works. Bottom row, left to right: W. W. Woolbank, Woolbank Pump and Machinery Co.; E. H. Triphaus, Taylor Instrument Co.; W. F. Lowe, secretary of N. G.A.A.; G. B. Lane, The Foxboro Co.; J. A. Lupfer, Worthington Machine Corp. of Okla.; D. W. McKay, Cooper Bessemer Corp.; W. D. Moorer, Moorlane Co.; M. H. Kotzebue, Worthington Machine Corp.; M. F. Waters, Hanlon-Waters, Inc.

PERSONAL

W. W. HAY, heretofore superintendent of Union Oil Co.'s Los Angeles pipe line, has been transferred to the head office in Los Angeles as manager of pipe line operations. LAFE TODD, general superintendent of the northern division, became general superintendent of all pipe lines, and R. V. ROSBOROUGH, formerly supervisor of pipe line operations in Los Angeles Basin, was transferred to San Luis Obispo as superintendent of the northern division in charge of the producers and Lompoc pipe lines. J. H. ROBINSON has assumed the post vacated by W. W. HAY and becomes superintendent of the Los Angeles pipe line with headquarters at Brea.

THOMAS S. HARRISON, geologist, has returned to Denver, Colo., from a business trip to Tulsa.

L. W. TARKENTON, of Pampa, Tex., was elected president of Quaker State Oil Company, which operates in New Mexico. Other officers elected were J. L. NOEL, vice president and G. C. STARK, secretary and treasurer. Directors elected included the above-named and DR. A. R. SAWYER, JOHN R. ROBY, CHARLES H. MUNDY, CHARLES F. MADEIRA, E. FITE and O. N. FRASHIER.

CHARLES D. WAGNER, vice president and manager, accompanied by E. E. STEVENSON, chief engineer, of the D + B Pump & Supply Company, of Los Angeles, Calif., left this week for Tulsa to attend the mid-year meeting of the American Petroleum Institute, and the International Petroleum Exposition and Congress, after which they will spend some time at the company's new enlarged plant recently completed at Dallas, Tex. Before returning to Los Angeles they will cover the Mid-Continent and Gulf Coast fields for the purpose of making a general survey of conditions in those territories.

ED KEENAN, of Calgary, Alberta, will leave shortly on a trip to the United Kingdom and Germany.

MR. and MRS. JOHN SUTHERLAND and family have returned from Negritos, Peru, and will spend the summer with relatives at Petrolia and Oil Springs, Ontario.

HOWARD S. BRYANT, district geologist for Skelly Oil Company in Kansas, was the principal speaker at the meeting of the Kansas Geological Society in Wichita last week. His paper dealt with the Cunningham field in Kingman and Pratt Counties, Kansas.

D. S. WALLBRIDGE, R. L. REID, H. RUSSELL, A. J. HENRY, W. A. SUTTON, J. T. TRUMBULL and F. E. BURKE were elected directors of Columbia Oils, Ltd., at a recent meeting in Vancouver, British Columbia. Mr. Wallbridge was elected president.

F. A. GABY, vice president and HERBERT H. BRONSDON, secretary of the British-American Oil Company, are returning to Toronto after a business trip to various Alberta and British Columbia points. In the course of the trip they visited the Turner Valley field and inspected various operations in which the company is interested.

JOHN BORDEN, president of the Old Dutch Refining Company, Muskegon, Mich., is visiting his home and plantation in Mississippi.

FLOYD SCOTT, independent operator of Fort Worth, is back in his office after a six-week's stay in Cook Memorial Hospital in that city, where he underwent an operation.

E. HAZEN WOODS has been made paleontologist for the Sinclair Prairie Oil Company at Midland to succeed LEO HENDRICKS, who has gone with Pine Rock Oil Company, with headquarters at Midland.

L. E. FOUST, heretofore superintendent of the Associated Oil Company's lower San Joaquin Valley division, was recently assigned to special duties with the land department of the company in San Francisco.

V. M. VOORHEES, former leading Muskegon and central Michigan contractor, has been placed in charge of drilling 20 test wells in Michigan for the Midland Petrol & Gas Company of Detroit. Principal operations are for gas in Millbrook Township.

DR. WILLIAM L. GOMORY, of New York and Chicago, chemical engineer, petroleum technologist and patent counsel, is in Europe on professional business and will include London, The Hague and Berlin in his itinerary. Doctor Gomory is celebrating his thirtieth year in the petroleum industry.

C. E. TABER of the Seaboard Petroleum Corporation, and R. P. HUGGINS of the Western Gulf Oil Company were the principal speakers at the last monthly meeting of the Los Angeles Petroleum Accountants Society held in Los Angeles. The topics discussed were functions and accounting of the land department and functions and accounting of the geological department of an oil company.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

Thirty-nine American subsidiaries of the Standard Oil Company of New Jersey are affected by the Supreme Court's recent decision that it is a "trust" in violation of the Sherman Act. The companies are incorporated in 11 states. The Jersey company owned a controlling interest, or all the stock, in the 39 concerns.

James Smith, chief of the manufacturing department of the Standard Oil Company, dies in New York, age 53 years. He had been with the company since 1873.

"Johnny" Newell, owner of the famous Newell's Hotel in Pittsburgh, Pa., is inspecting his Osage County, Oklahoma, oil properties.

20 YEARS AGO

Mrs. Laura Drake, widow of Col. E. L. Drake, dies in Philadelphia. She had been living on a $1,500 annual pension granted by the state of Pennsylvania.

Kansas produces 24,000 barrels per day, of which 14,000 barrels come from the Augusta-Eldorado district in Butler County, and 10,000 barrels from the shallow fields.

John L. Apple, notable pioneer oil producer, dies in Augusta, Kans. He had operated 41 years.

Devonian Oil Company, which a year ago sold its Cushing properties for $2,000,000, is now negotiating with Cosden & Company for the sale of $1,000,000 worth of production and leases in Oklahoma.

10 YEARS AGO

Paul Weaver, geologist and petroleum engineer, has resigned from the Cia Mexicana de Petroles in Mexico to go with the Gulf Petroleum Corporation in Houston.

The term "Ethyl" as applied to an antiknock ingredient, which is added to gasoline, is a trade mark controlled by the Ethyl Gasoline Corporation.

Compulsory unit operation is impossible under the constitution says Former Justice Charles Evans Hughes, in an address before the Federal Oil Conservation Board. Henry L. Doherty of Cities Service Company dissents and obtains permission to file a reply.

C. J. McFARLANE of Calgary, Alberta, western manager of the Ethyl Gasoline Corp., is attending the firm's convention at Detroit, Mich.

A. J. SMITH, vice president of Abasand Oils, Ltd., who has been supervising preparatory work for his company near McMurray, Alberta, is spending a couple of weeks in Toronto, Ontario.

WILLIAM L. HORNER, of Core Laboratories, Inc., Dallas, will address the National Oil Scouts Association which holds its convention in Dallas on May 29-31. His subject will be "Core Analysis as a Control to Well Completions."

FRANK ODA, representative of Asano Bussan and a graduate of the University of Washington, has been spending the past few weeks in Los Angeles, but is expected to return to the home office of Asano Bussan in Japan within another few weeks.

R. H. ALLAGOOD, geological scout for the Sinclair Prairie Oil Company, has taken IRA BRINKERHOFF'S place in the West Texas district. Mr. Brinkerhoff has taken a position with the Stanolind Oil & Gas Company and has been transferred to Houston.

E. A. CHESTER, formerly in the Panhandle Texas field with the Magnolia Petroleum Company, has been promoted to superintendent of the company's properties in the new Tecumseh, Mich., field. Before going to Michigan, he is reporting to the Socony-Vacuum offices in New York.

J. W. JORDAN, has been made superintendent of the newly created West Texas-New Mexico division of the Sinclair Prairie Oil Company, with headquarters at Midland, Tex. THOMAS P. CARR, formerly division clerk at Fort Worth, has been transferred to Midland by the company.

PARAGRAPHS

FRANK MacKAY, Tulsa, has been elected a director and vice president of Superior Oil Corporation and the Superior Oil & Gas Company of Tulsa, Okla.

HARRY J. BROWN, of Tulsa, and ALBERT S. CLINKSCALES and PAUL G. DARROUGH, of Oklahoma City, Okla., have organized the Southwestern Drilling Company.

N. V. SAMSTRELOV, vice president and chief engineer of Bashneft, U.S.S.R.; J. L. DAVIDOVITCH, chief geologist of Bashneft of the Amtorg Trading Corporation, New York; A. M. BABRILIAN, chief geologist of the Middle Asia Petroleum Company, U.S.S.R., have been visiting the West Texas and New Mexico fields on an inspection trip.

E. L. DECKER left Long Beach, Calif., the latter part of April on an extended trip. The first leg of which took him to Texas. From the Gulf Coast his itinerary took him to Tulsa to look after the Martin-Decker exhibit at the International Petroleum Exposition. Following the show the Mid-Continent fields will be covered and then he will go on to New York to look after the company's export business. Later on the Rocky Mountain territory will be visited. "Deck" will be away from his California office about four months.

PAUL STOCK, president of the Stock Oil Company, stopped in Denver, Colo., on his way home at Cody, Wyo., from a business trip east.

S. D. BUTCHER is in charge of Turman Oil Company's new land and geologic headquarters in the Gulf Coast field with offices in the Esperson Building in Houston, Tex.

E. G. DAHLGREN, chief clerk of the Oklahoma conservation department, recently completed a detailed survey of the Oklahoma oil industry for the American Institute of Mining and Metallurgical Engineers.

T. H. RIGGIN is the new purchasing agent for H. F. Wilcox Oil & Gas Company, taking over duties formerly handled by FRANK DUNN, new executive vice president, and HAROLD WARD, now a director.

ROY G. CULLEN of Houston, Tex., secretary and treasurer of the Quintana Petroleum Company, was critically injured when he was crushed by a falling derrick of a wildcat well northeast of Edinburg in Hidalgo County.

A. M. McCORKLE, Fort Worth, Tex., vice president of Stanolind Oil & Gas Company in charge of the Texas, Louisiana and New Mexico division, was an overnight visitor in Shreveport, La., last week while en route from Baton Rouge, La., to his home.

At the regular annual meeting of the Coast Counties Gas & Electric Co. H. L. FARRAR was elected president; W. H. BERG, R. W. HANNA and J. H. TUTTLE, vice presidents; B. W. LETCHER, secretary, and V. F. PALMER, treasurer. Directors of the company, in addition to Messrs. Farrar, Berg, Hanna and Tuttle, include H. D. COLLIER, EARLE DERBY, G. E. KENNEDY, P. H. PATCHIN and A. S. RUSSELL.

ROBERT WILKINSON, of Calgary, Alberta, prominent in recent Turner Valley developments, has left on a several months' trip to Great Britain.

C. R. COX, formerly general superintendent of Ellwood Works of National Tube Company, was, on May 12, elected vice president in charge of engineering and operations of the company, succeeding P. C. PATTERSON, who was associated with the company for 49 years. Mr. Patterson attended the University of Pittsburgh and entered the employ of National Tube Works Company at McKeesport in 1886. Mr. Cox was graduated from New York University in 1914. In 1920 he entered the employ of Pittsburgh Crucible Steel Company at Midland, Pa., and in 1925 became superintendent and in 1927 manager of the Park works of Crucible Steel. In 1930 he was appointed superintendent of the Babcock & Wilcox Tube Company plant at Beaver Falls, Pa. In 1934 he was appointed assistant general superintendent and in 1935 general superintendent of Ellwood Works of National Tube Company. His office will be in Pittsburgh, Pa.

GORDON FISHER, JR., after serving as sales representative for Spang, Chalfant & Company in the Tulsa office for a little more than one year, was promoted to manager of sales for the Oklahoma-Kansas district and now reports direct to company headquarters in Pittsburgh, Pa., instead of through the St. Louis, Mo., office. Mr. Fisher, who is a native of Pittsburgh, Pa., attended Shadyside Academy there, later graduating from Lawrenceville Preparatory School in New Jersey, followed by two years in Princeton University. Upon leaving school Mr. Fisher was in the service of the Carnegie Steel Company for five years.

GEORGE H. RAWLINGS, of Chatham, Ontario, recently spent a few days in Findlay, Ohio.

Moved Up in Magnolia

E. E. Swope, recently moved up to general manager of refineries for Magnolia Petroleum Company, was a farm-boy. Born in Colfax, a hamlet in Huntingdon County, Pennsylvania, in 1885, he passed his boyhood in rural surroundings, but he decided not to stay among them. At 17 he was ready for a job as mechanical draftsman in the Westinghouse works in East Pittsburgh, Pa., and in 1912 he graduated from Pennsylvania State College as an engineer. Shortly afterward he entered the employ of Burns & McDonnel, Kansas City, Mo., consultants, as a supervising engineer on hydraulic and sanitary work.

E. E. SWOPE

In 1917 Mr. Swope joined Magnolia as an engineer in Beaumont, Tex. Six months later he was made chief engineer, which position he held till December 6, 1928, when he became assistant general manager. In February of the present year he was advanced to general manager of refineries, overseeing Magnolia's plants in Beaumont, Luling, Corsicana, and Fort Worth, Tex.

Mr. Swope married Miss Charlotte Miller of Huntingdon, Pa., in 1913, and they have three sons. He has been active in the work of the Beaumont Chamber of Commerce, Beaumont Community Chest Board and the Rotary Club. He is a director of the Lower Neches Valley Authority, which is sponsoring the proposed Rockland project for supplying fresh water to the Beaumont area for irrigation and industrial purposes at an outlay of $13,000,000.

A. E. JOHNSON, president of the Salt Creek Producers Association and Argo Oil Company, left Denver, Colo., on a business trip to Chicago, Ill., and Washington, D. C.

N. W. BASS, of the U. S. Geological Survey, Tulsa, addressed the North Texas Geological Society at its monthly meeting on May 9 on "The Shoestring Sands of Oklahoma and Kansas."

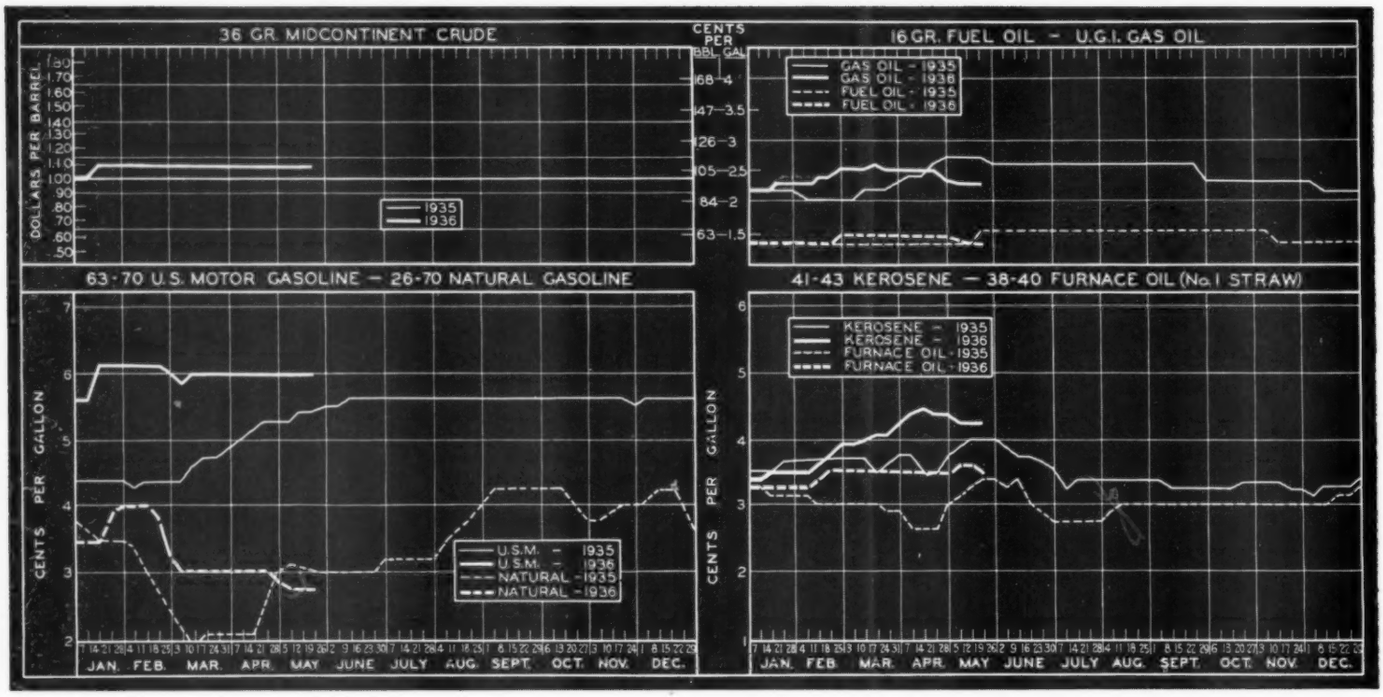
ALFRED GIONTA, formerly with Eastman Oil Well Survey Company, has joined Hall-Briscoe, Inc., as engineer. He will be in charge of erection of the Hall-Briscoe gas lift plant at Oklahoma City, Okla.

VAN PATTON of Dallas, who was active in leasing the Long Lake and Cayuga structures in Anderson County, East Texas, for Tide Water Oil Company and Seaboard Oil Company, was a visitor in Shreveport, La., last week.

JULIAN and JACK MEEKER, Fort Worth, Tex., independent oil men, spent most of last week in Shreveport, La., and El Dorado, Ark., checking into the numerous structural possibilities for deep Trinity or Permian production in the two states.

E. G. ALLEN of Dallas, Tex., formerly production superintendent for Shell Petroleum Corporation in the Dallas and Houston districts, was among out-of-state oil men investigating the North Louisiana fields last week. He spent three days in Shreveport, La.

LEO D. STEVENS of Shreveport, La., has been appointed distributor for the Shoreline Oil Company's products in his home territory. The Shoreline company's Lewis, La., plant is capable of processing 25,000 gallons of lubricating oil daily and the company is now completing reforming and cracking units at the plant.


36 GR. MIDCONTINENT CRUDE
DOLLARS PER BARREL
1935
1936
CENTS PER BBL GAL
16 GR. FUEL OIL - U.G.I. GAS OIL
GAS OIL - 1935
GAS OIL - 1936
FUEL OIL - 1935
FUEL OIL - 1936
63-70 U.S. MOTOR GASOLINE — 26-70 NATURAL GASOLINE
CENTS PER GALLON
U.S.M. - 1935
U.S.M. - 1936
NATURAL - 1935
NATURAL - 1936
41-43 KEROSENE — 38-40 FURNACE OIL (No. 1 STRAW)
KEROSENE - 1935
KEROSENE - 1936
FURNACE OIL - 1935
FURNACE OIL - 1936
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)

Confused Gasoline Market Is Feeling Its Way in the Group 3 District

By T. F. SMILEY

A somewhat confused gasoline market was feeling its way in the Group 3 territory this week. What were the chances of getting rid of that 12,000,000 or so barrels of material which refiners produced to meet a demand which has not yet materialized? What effect is Rodessa going to have? Will crude production be cut to actual requirements? Can weaknesses in the retail division be corrected in time to avert further damage to the tankcar market? Is the delayed spring pickup under way? Will it develop a magnitude that will put the motor fuel market on a thoroughly sound basis? Most of the trade found no satisfying answers to these and similar questions and simply hoped for the best.

Softened Market Seen

Although tankcar prices were holding, observers expressed the view that there had been a slight softening of the market. Some attributed it to the increased volume of Rodessa gasoline which was finding its way into northern areas. Although some buyers indicate unwillingness to accept this material at other than bargain prices, enough of it is going to service stations, according to reports, to start speculation concerning its ultimate importance as a market factor.

In contrasting last year's market with the present one, two conditions are pointed to as affording the primary reason for the rising prices which began in March, 1935, and continued till June, whereas March, 1936, witnessed a drop in the price level from which it has not yet recovered. Those two conditions were, first, a federal tender board which eliminated the shipment out of East Texas of illicit crude and its derivatives, and, second, an unprecedented demand for gasoline. This demand, favored by fine motoring weather, began early in the spring and continued on to late in the fall.

Predicated on last year's consumption, an increase of 9 per cent in the output for 1936 was estimated to be needful. With last year's experience still fresh in their minds, refiners began to set up production schedules designed to meet the expected jump in demand. How road and weather conditions upset the plans of sales managers is now disheartening history, which explains pretty fully how the refining industry acquired immense surplus stocks of gasoline, but doesn't help at all in pointing the way to removal of these stocks. Notwithstanding present discouragements, the trade generally displays a fairly cheerful mien. Smashing demand is expected as soon as the vacation season begins, and strong hopes still are entertained that heavy drafts on stocks, along with reduction in crude output and runs to stills, will go far toward removing what at this juncture looks like a major problem. Reports of lively week-end demand in Group 3 consuming areas contributed to a hopeful mood. So did the action of the Texas Railroad Commission in issuing an emergency order which is expected to cut about 50,000 bbls. daily from the state's production through reduction of allowables.

Natural Gasoline Lifeless

Jobber buying of natural gasoline has failed to expand, and manufacturers are depending on refinery orders. The market was lifeless this week, but opinion in the trade seemed to be that prices had touched bottom for the current season. It was believed that further lowering of quotations would fail to land any business. "It no longer is a matter of price," was one expression. "Manufacturers couldn't dispose of any more natural if they gave it away." California buying, which helped the Mid-Continent natural markets has slowed up.

Following a softened market, kerosene was in better position this week. Several refiners reported they had been obliged to buy in the open market to get material to fill their own contracts.

The neutral market was regaining its equilibrium after being disturbed by reported sales of 200-viscosity, No. 3 color, and 180-viscosity No. 4 color material at concession prices. Refiners generally reported their refusal to meet the cut prices, which were said to have been withdrawn later.

Refined Oil Market Barometer

Heightened consumption is imparting to the motor fuel market a better tone, which might easily show more pronounced improvement if it were not for certain untoward factors, particularly the rising trend in crude output and failure in some quarters to curb runs to stills. Scattered weak spots in the retail division are exerting an adverse influence on tankcar prices.

MID-CONTINENT. Gasoline easy. Naturals weak. Kerosene in better position.

EAST COAST. Increasing consumption firming gasoline. Export market sluggish.

GULF COAST. Gasoline and kerosene stronger. Burning oils steady.

PENNSYLVANIA. General market dull.

CALIFORNIA. Refined and natural gasoline higher. Fuel oil firm. Lubricants soft.

CHICAGO. Gasoline steadier. Farm demand for gasoline and tractor fuel growing.

Substantial Improvement in Demand Bolsters Eastern Coast Markets

NEW YORK, May 16—A very substantial improvement in consumption helped maintain a firm gasoline price structure on the Atlantic Seaboard during the past week. The improvement in demand came at a fortunate time. The trade had begun to worry seriously about the crude production trend, so something was needed to bolster the morale of the marketers in this section. There are still several weak spots, notably in the Boston area, in Buffalo, where the tank car price has been reduced by one-quarter cent, and a portion of the Metropolitan New York area. Elsewhere the price structure continues unchanged.

Considerable disappointment is evident that the production situation has developed as an actual threat over the refined oil markets. It is felt that with a firmer groundwork, the gasoline markets in the East would have shown actual strength by this time, despite the relatively large stocks of motor fuel. Now with a possibility the crude structure may slip, local oil men see nothing more ahead than a maintenance of present gasoline prices.

The local trade has recently heard disquieting reports from the East Texas and Rodessa oil area. One report was that a large quantity of East Texas crude was being offered for sale at a substantial discount below the posted price. This is the sort of thing that, in the past, has led finally to a weakening of the wholesale gasoline price level in the Mid-Continent field. Should any distress crude now on the market get into strong hands it would undoubtedly save the situation, but should buyers hold off it is believed anything might happen.

The refinery gasoline market in this section has not undergone any marked change. The large majority of refiners are posting 7 cents for 65 octane, and 7¼ cents for 68-70 octane, with a particularly good demand reported for the latter. Aviation gasoline is said to be moving in far greater volume than ever before. The current market for this gasoline, which averages 73 octane and above, is 10 cents in tankcar lots, f.o.b. Bayonne, N. J. It is said a large part of this business in the East centers in the airports near New York City and Washington, D. C.

During the week ended May 9 there was a relatively small decrease in stocks of gasoline on hand in the United States. The Atlantic Seaboard refineries accounted for only 20,000 bbls. of the total decrease of 217,000 bbls. for the country as a whole. It is expected the figures for the week ended May 16 will tell a different story for the East Coast, where conditions have been particularly favorable for consumption. It is believed refiners in this section currently are cutting down their production of gasoline to help the situation as much as possible. For the week ended May 9, they cut runs to 80.7 per cent of capacity, against 82.5 per cent the week before. Unfortunately, according to the best available figures, refiners in the Mid-Continent increased their runs, while those on the Gulf Coast held theirs about even.

This trend in refining operations may check with reported softening of the Group 3 tankcar gasoline market, but, at any rate, it can be said this softening has not been communicated to the Eastern market in the slightest degree.

Standard Oil Co. (New Jersey), in its annual report, remarks significantly with respect to the trend of the general marketing outlook:

"The inability of marketers to make a good earnings statement, even with augmented sales, emphasizes more clearly than before the nature of certain fundamental difficulties, and evils underlying the selling of gasoline. These conditions are general and while most of them are of long standing, there is good reason now to feel that progress is being made toward their correction."

The company itemizes the principal factors which have unfavorably affected domestic marketing. All three factors mentioned can be expressed in the one word "overexpansion"; overproduction of crude oil; excess of refining capacity, and overbuilding of wholesale and retail distributing stations.

It has been noted that there appears to have been a distinct lessening in the rate of new service station building along the Atlantic Coast during the past few years. In numerous sections the retail gasoline trade seems to have settled down to a normal basis, with few new stations constructed and few changes in the ownership of those which exist. At one time there was a veritable orgy of switching of brands by service stations. This appears to have been very much reduced.

The promise of basic improvement held out by the Jersey company report, and corroborated by marketers who have closely studied the trend of recent developments, is reassuring from the viewpoint of looking beyond the immediate temporary swings in the market.

Furnace oils, kerosene, and all grades of fuel oil continued firm during the week. No changes in quotations were recorded. The furnace oil movement was above expectation.

In some quarters higher prices for diesel oil and bunker oil for the marine trade are still looked for in the near future. These products are moving briskly, and an advance has been expected for some weeks.

Lubricating oil prices are firm. No new advances have been registered but current higher levels do not seem to have discouraged demand. It is generally felt present prices have fully discounted favorable developments.

The paraffin wax market is generally firm, particularly in the refined listings. Crude scale wax, although continuing unchanged in price, is showing a tendency to taper off. In some quarters this is regarded as a purely temporary condition.

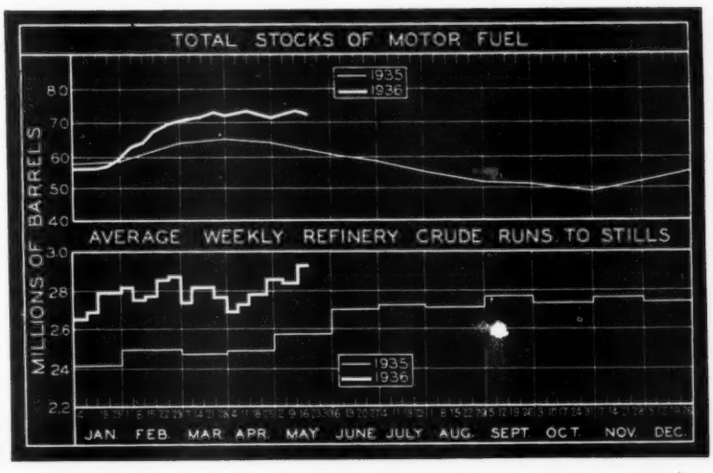
The petrolatum market is firm with the exception of dark green, which is reported being offered as low as 1¾ cents in barrels for carload lots. The more important marketers still are asking 1⅞ cents, but if the current weakness continue they may have to readjust their price in the near future. Other grades continue unchanged in prices, from 2⅞@3 for amber, to 7¾@7¾ for snow white. Cream is quoted at 5⅝@5¾.

A. P. I. Weekly Refinery Statistics

Week Ending May 16, 1936

	Capacity reporting (per cent)	Daily crude runs (bbls.)	Total gasoline stocks	Gas oil and fuel oil stocks
East Coast	100.0	489,000	19,681,000	8,003,000
Appalachian	94.8	100,000	2,614,000	442,000
Indiana, Illinois, Kentucky	95.9	408,000	11,147,000	3,267,000
Oklahoma, Kansas, Missouri	84.8	295,000	7,579,000	2,666,000
Inland Texas	48.5	108,000	1,510,000	1,695,000
Texas Gulf	96.8	598,000	8,222,000	6,597,000
Louisiana Gulf	96.4	116,000	1,737,000	1,926,000
North Louisiana and Arkansas	90.0	51,000	425,000	389,000
Rocky Mountains	61.9	47,000	1,562,000	730,000
California	92.6	528,000	13,145,000	71,134,000
Total reported	89.6	2,740,000	67,622,000	96,849,000
Estimated unreported	.....	180,000	4,868,000	2,271,000
*Estimated total	.....	2,920,000	72,490,000	99,120,000
*Estimated total previous week	.....	2,870,000	73,489,000	98,550,000
†May 31, 1935	.....	2,594,000	61,483,000	100,177,000

*Bureau of Mines basis currently estimated. †Monthly report, U. S. Bureau of Mines.



Export Markets

The Gulf Coast export situation was quiet during the week. It is reported there has been some improvement in buying and new inquiries but insufficient to give the market an active appearance.

It is understood Italian buyers have been making inquiries in the market for fuel oil for June delivery, with one cargo of approximately 40,000 bbls. already closed. Rumania seems to be getting the bulk of the gasoline business involving spot cargoes from Continental buyers, reflecting principally the small price-advantage Rumania enjoys over this market. Japan is said to be in the market for American fuel oil and has closed for a considerable quantity with California interests.

Foreign spot buyers of gasoline are known for their uncanny ability to forecast price trends, and the growing inquiries in the Gulf Coast export market from them may be due to the fact they sense a slight softening in this market.

Whether they will prove correct in this view will depend largely on developments in the domestic situation. Gasoline has been moving at such a satisfactory rate at home few of the companies which do both a domestic and export business are showing any particular interest in filling export orders.

RETAIL OIL MARKETS

Tank-wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of May 19, 1936

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline is the regular or standard grade. In most areas a third grade and a premium grade are also available.

Discounts

Under the standard form of commercial consumer contract which went into effect March 1, 1934, save in California, Oregon, Washington, Arizona and Nevada, a discount of 1 cent a gallon off tank-wagon or 3 cents a gallon off retail prices is permitted for purchases between 4,000 and 10,000 gallons per month, or 4 cents a gallon off retail prices for purchases in lots of more than 10,000 gallons a month. The minimum delivery is 25 gallons.

Standard Oil Co. (Indiana)

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Chicago	15.5	17.5	4.0	10.1
Decatur, Ill.	16.0	18.0	4.0	10.1
E. St. Louis	15 7	17.7	4.0	9.8
Joliet	16.0	17.0	4.0	10.1
Peoria	16.0	18.0	4.0	10.1
Quincy	15.8	17.8	4.0	9.9
Davenport, Ia.	16.0	(†)	4.0	10.1
Des Moines	15.8	(†)	4.0	9 9
Mason City	16.2	(†)	4.0	10.3
Sioux City	16.0	(†)	4.0	10.1
Duluth, Minn.	16.8	18.8	4.0	10.9
Mankato	16 4	18.4	4.0	10.5
Minneapolis	16.4	18 4	4.0	10.5
LaCrosse, Wis.	17.4	19.4	5.0	10.5
Green Bay	17.7	19.7	5.0	10.8
Milwaukee	16.3	18.3	5.0	10 4
Madison	17.4	19.4	5.0	10 5
Detroit, Mich.	14.0	16.0	4.0	8.8
Grand Rapids	16.4	18.4	4.0	9.3
Saginaw	16 6	18.6	4.0	10.1
Evansville, Ind.	17 7	19.7	5.0	10.6
Indianapolis	17.9	19.9	5.0	10.8
South Bend	18.1	20.1	5.0	11.0
Fargo, N. Dak.	17.4	19.4	4.0	11.5
Huron, S. Dak.	17.9	19 9	5.0	11.0
Sioux Falls	17.4	19.4	5.0	10.5
Kans. City, Mo.*	15.4	17.4	4.0	8.0
Springfield	15.1	17.1	4 0	9.2
St. Louis	15.7	17.7	4.0	9.8
St. Joseph*	15.4	17.4	4.0	9.5
Wichita, Kans.	14.9	16.9	4 0	7.1
Bartlesville, Ok.	15.0	19.0	5.0	8.5

*State tax 2 cents, 1-cent city tax and 1-cent federal tax.

†Standard Oil Co. (Indiana) has leased all service stations in Iowa.

Discounts to dealers except in Iowa: 3½ cents on premium and regular and 2½ cents on third grade off service station prices; discounts to dealers in metropolitan Chicago one-half cent larger than rest of Standard of Indiana territory, namely 4 cents and 3 cents on respective grades. Dealers in Iowa sold at posted "Dealer Prices."

Stanolex Fuel Oil in Chicago

Effective February 10, 1936, f.o.b. Chicago tank-wagon prices: Range oil, less than 100 gallons, 8.75 cents; 100-149 gallons, 7.75 cents; 150 gallons and more, 7.25 cents. 1 (36-40 lt. stw. zero), less than 100 gallons, 8.75 cents; 100-149 gallons, 7.75 cents; 150 gallons or more, 7.25 cents; No. 3. (22-26 zero), less than 150 gallons, 7.5 cents; 150 gallons or more, 6.5 cents; No. 4 (12-16 zero), less than 400 gallons, 7.5 cents; 400 gallons or more, 6.5 cents, viscosity of No. 4, 85° and 100° F.; No. 5, less than 400 gallons, 5.75 cents; 400 gallons or more, 4.75 cents.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Denver, Colo.	18.0	20.0	5.0	11.0
Pueblo	18.0	20.0	5.0	13.0
Grand Junction.	21 5	23.5	5.0	15.0
Casper, Wyo.	19.5	21.5	5.0	11.5
Cheyenne	19.5	21.5	5.0	13.0
Butte, Mont.	21.0	....	6.0	14.5
Billings	22.5	24.5	6.0	14 5
Helena	22.5	24.5	6.0	17.5
Great Falls	22.5	24.5	6 0	14.5
Salt Lake, Utah	21.0	23.0	5.0	16.0
Twin Falls, Ida.	23 0	25.0	6 0	18.0
Boise	22.5	24.5	6.0	18.0
Albu'que, N. M.	18.5	20.5	*6.5	13.0

*Includes one-half cent city tax.

Discount to dealers with or without contract in Continental territory: Undivided dealer discount off service station price, 4 cents; divided dealer accounts, 3½ cents.

Southern District

STANDARD OIL CO. OF KENTUCKY

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Atlanta, Ga.	20.5	22.5	7.0	*13.5
Augusta	20.0	22.0	7.0	*13 0
Macon	20.0	22.0	7.0	*14.5
Savannah	18.5	20.5	7.0	*13.0
Birm'ham, Ala.	21.0	23.0	8.0	12 0
Mobile	21 0	23.0	8.0	12.0
Montgomery	22.0	24.0	9 0	14.5
Jackson, Miss.	20.0	22.0	7.0	*13.0
Vicksburg	19.5	21 5	7.0	*13.0
Jacksonville, Fla.	18.0	20.0	8.0	12.0
Miami	19.5	21.5	8.0	13 5
Pensacola	21.5	23.5	9.0	12.0
Tampa	18.0	20 0	8.0	12.5
Lexington, Ky.	19.0	21.0	6.0	11 0
Covington	18.5	20.5	6.0	10.5
Louisville	18.5	20.0	6.0	10.0
Paducah	18 0	19.0	6.0	8 5

*Includes 1 cent state tax. Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax; and 1 cent per gallon on kerosene. Mobile and Birmingham, Ala., each have a city gasoline tax of 1 cent per gallon. Pensacola, Fla., has a city gasoline tax of 1 cent.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
San Francisco	17.0	18.0	4.0	11.5
Los Angeles	16.5	17.5	4.0	9.0
Fresno, Calif.	17.5	18.5	4.0	11.0
Phoenix, Ariz.	21.0	22.0	6 0	‡16.0
Reno, Nev.	19 5	20.5	5.0	13.0
Portland, Ore.	19.5	20.5	6.0	13.5
Seattle, Wash.	19.5	20.5	6.0	13 5
Tacoma	19.5	20 5	6.0	13.5
Spokane	22.5	23 5	6.0	16.5

*Retail prices posted by Standard Stations, Inc., a subsidiary.

†Prices are at company's plant or depots, as company does not operate stations. A 4-cent per gallon discount is given dealers and customers taking tank-wagon lots except in Phoenix where discount is 1 cent.

‡Includes 5-cent state tax.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Atl'tic City, N.J.	14.3	17.8	4.0	9.0
Newark	14.3	17.8	4.0	7.5
Annapolis, Md.	15.6	19.1	5.0	10.0
Baltimore	15.0	18.5	5.0	8.0
Cumberland	16.6	20.1	5.0	12.7
Wash'g'n, D. C.	13.0	16.5	3.0	9.0
Danville, Va.	17.5	21 0	6.0	12.9
Norfolk	16 0	19.5	6.0	11.3
Petersburg	16.5	20.0	6 0	11.7
Richmond	16.5	20.0	6.0	11.7
Raonoke	17.5	21.0	6.0	12 9
Charles'n, W. Va.	15.8	19.3	5.0	12.6
Parkersburg	15.1	18.6	5.0	11.2
Wheeling	16.0	19 5	5.0	12.2
Charlotte, N. C.	18.7	22.2	7 0	12.9
Hickory	19.0	22.5	7.0	13.1
Mt. Airy	19.0	22.5	7.0	13.2
Raleigh	18 4	21.9	7.0	12.7
Salisbury	18 5	22.3	7.0	13.0
Charleston, S.C.	17.0	20.5	7.0	11.3
Columbia	18.3	21.8	7.0	12 6
Spartanburg	18.7	22.2	7.0	12.9

Tank-wagon gasoline refers to dealer instead of retail prices.

Price basis to dealers: Undivided dealers at regular price less one-half cent. Discount for kerosene, 1 cent off tank wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except in New Jersey, where no discount (if necessary) is given.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Omaha	18 4	20.4	6.0	10.4
McCook	19.1	21 1	6.0	11.1
Norfolk	18.8	20.8	6.0	10.8
North Platte	19.2	21.2	6.0	11.2
Scottsbluff	19.9	21.9	6 0	11.9

Note—Discounts to dealers: where service station gasoline prices are (maximum overall, including rent) as follows: Reliance, 2½ cents; Standard Red Crown, 3½ cents; Red Crown Ethyl, 3½ cents.

Where service station gasoline prices are below normal resellers' allowances are reduced one-half of the amount below normal, down to the following (minimum overall, including rent): Reliance, 2 cents; Standard Red Crown, 3 cents; Red Crown Ethyl, 3 cents. Discounts to consumers for tank-wagon deliveries covered only by Standard Commercial Consumers Contract, effective January 1, 1935.

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Philadelphia, Pa.	16.5	17.5	5.0	9.5
Pittsburgh	17.5	19.5	5.0	10.0
Allentown	17.0	18.0	5.0	9.5
Erie	17.5	18.5	5 0	8.0
Scranton	16.75	17.0	5.0	10.0
Altoona	17.5	19.5	5.0	9.5
Dover, Del.	17.0	17.0	5.0	10.0
Wilmington	16.5	16 5	5.0	9.5
Springf'ld, Mass.	14.0	17.5	4.0	7.5
Worcester	13.5	17.0	4.0	7.75
Hartford, Conn.	14.5	18.0	4.0	7 0
New Haven	13.0	16.5	4.0	7.5
Providence, R. I.	12.0	15.5	3.0	7.0

Note—Tank-wagon prices are those applicable to consumers purchasing lots of 100 or more gallons in one delivery.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
N. Orleans, La.	18 5	22.0	‡9.0	12.0
Baton Rouge	17.5	21.0	†7.0	11.5
Alexandria	18.5	22.0	†*8.0	11.0
Lafayette	19 0	22.5	‡*8.0	12.5
Lake Charles	19.0	22 5	†*8.0	11.0
Shreveport	17.0	20.5	†7.0	10.0
Knoxville, Tenn.	21.0	24.5	8.0	14.0
Memphis	19.0	22 5	8.0	11.0
Chattanooga	20.5	24.0	8 0	11.5
Nashville	20.0	23.5	8.0	10.0
Bristol	18.75	21.5	8 0	14.5

*Includes city tax of 1 cent.

†Includes 1-cent parish tax. ‡Includes 3-cent parish tax.

Tank-wagon gasoline refers to dealer instead of retail prices.

Price basis to dealers: Undivided dealers at dealer price less one-half cent.

Louisiana kerosene prices include 1-cent state tax.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline Post deal	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Albany, N. Y.	14.0	17.5	5 0	7.75
*Met. N. Y.:				
Manhtn., Bronx	14.2	19.2	5.0	7.25
Staten Island	14.2	19.2	5.0	7.25
Qu'ns & Br'klyn	14 2	19.2	5.0	7.25
Buffalo	14.5	18 0	5.0	8.25
Rochester	14.5	18.0	5.0	8.25
Syracuse	14.5	18.0	5.0	8 75
Boston, Mass.	12.5	16.0	4 0	7.5
Portland, Me.	14.5	18.0	5.0	7.75
Manch'ter, N. H.	15.0	18.5	5.0	8.0
Burlington, Vt.	17.0	20.5	5.0	8.75

*Does not include 2 per cent city sales tax which is calculated on basis of net retail price exclusive of state and federal taxes.

Southwestern District

MAGNOLIA PETROLEUM CO.

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Dallas, Tex.	13 5	17 0	5.0	8.5
Fort Worth	13.5	17.0	5.0	8.5
Houston	13.5	17.0	5.0	8.5
San Antonio	14.0	18.0	5.0	8.5
El Paso	15.0	19.0	5.0	8.0
Muskogee, Ok.	15 0	19 0	5.0	8.0
Okla. City	15.0	19.0	5.0	8.0
Tulsa	15.0	19.0	5.0	8.0
Ft. Smith, Ark.	15.5	19.0	5.0	8.0
Little Rock	13 0	21 5	7.5	9.5
Texarkana	14.5	18.5	5.0	8.5

Naphtha

STANDARD OIL CO. (INDIANA)

	Tank wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16.0
Cleaners' naphtha	15.0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax or 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150-gallon lots if covered by contract.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Ohio points	17.5	19.5	5.0	*13.5

*Includes state tax of 1 cent.

Canada*

Imperial 3-Star Gasoline

IMPERIAL OIL, LTD.

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Hamilton, Ont.	21.0	23.5	6.0	17.0
Toronto, Ont.	21.0	23.5	6.0	17.0
Brandon, Man.	30.8	33.8	7.0	22.3
Winnipeg, Man.	29.2	32.2	7.0	20.7
Regina, Sask.	30.5	33.5	7.0	22.0
Saskatoon, Sask.	33.3	36.3	7.0	24.8
Edmonton, Alta.	32.7	35.7	7.0	24.2
Calgary, Alta.	30.0	33.0	7.0	21.5
Vancouver, B. C.	26 0	29.0	7.0	24.0
Montreal, Que.	19.5	22.0	6.0	17.5
St. John, N. B.	25.0	29.0	8.0	19.5
Halifax, N. S.	25.0	29.0	8.0	19.5

*Imperial gallon used in Canada.

Discount to dealers: Divided dealers pay 3 cents per gallon below station price; undivided dealers pay 4 cents per gallon below station price except in cities of Hamilton, Toronto and Montreal where discounts below station price are one-half cent per gallon less.

Retail Price Changes

Standard Oil Co. (Indiana) May 14 advanced tank-wagon and station gasoline .5 cent in Chicago.

Atlantic Refining Co. May 2 advanced station gasoline 1 cent in Allentown and Scranton; May 6 reduced tank-wagon kerosene .25 cent in Providence.

Magnolia Petroleum Co. May 15 advanced tank-wagon gasoline .5 cent and station gasoline 1 cent in San Antonio.

Continental Oil Co., May 14, advanced tank-wagon and station gasoline 2.5 cents in Great Falls.

Fuel for Hindenburg Ship

The specifications for the diesel oil used by the airship Hindenburg follow:

Diesel index, 49.

Pourpoint, 60° below zero F.

Flashpoint, 180° F.

Color, 15 Robinson scale.

Viscosity, 37 seconds at 100° F.

This diesel oil is unusual in having a combination of a high index and at the same time an unusually low pourpoint. This was essential in order to meet the requirements of the Hindenburg which encounters a wide range of temperatures.

Mobilgas Signs

The familiar "Socony" signs of New York, New England and northern New Jersey are being supplanted by signs reading "Mobilgas." Frederick Ewing, vice president in charge of sales of Standard Oil of New York, division of Socony-Vacuum, stated the introduction of the new fuel will give Mobilgas coast-to-coast distribution.

George Hanners, an active independent producer in central Michigan oil and gas fields since the area was opened up in early 1928, has been elected president of the Superior Oil Co., operators of an independent refinery at Elsie, Mich.

Paul C. Stevens, president of the Muskegon Boiler Works, suppliers of a large percentage of the equipment installed in independent refineries in Michigan, is attending the International Petroleum Exposition in Tulsa this week. He will pay a visit to Dallas before returning.

PRICES OF REFINED PRODUCTS

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of May 19, 1936

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
62 octane and below (3d. gr.)	.04⅞	.05⅛
63-67 octane	.05⅛	.05⅜
68-70 octane (regular)	.06	.06¼
60-62 400 grades:		
62 octane and below	.04⅞	.05⅛
63-67 octane	.05⅛	.05⅜
68-70 octane (regular)	.06	.06¼
64-66 375	.05⅛	.05¼
68-70 360	.05¼	.05⅜

NORTH TEXAS—

U. S. Motor grades:		
62 octane and below	.04⅞	.05⅛
63-67 octane	.05⅛	.05⅜
68-70 octane (regular)	.06	.06¼
60-62 400	.05	.05⅛
64-66 375	.05⅛	.05¼

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

U. S. Motor grades:		
62 octane and below		.05⅜
63-67 octane		.06⅛
68-70 octane (regular)		.06⅜
60-62 400	.05⅜	.06

ARKANSAS (Ark., N. La., Miss. del.)—

U. S. Motor grades:	
62 octane and below	.05⅜
63-67 octane	.06⅛
68-70 octane (regular)	.06⅜

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
62 octane and below	.04⅞	.05⅛
63-67 octane	.05⅛	.05⅜
68-70 octane (regular)	.06	.06¼
60-62 400 grades:		
62 octane and below	.04⅞	.05⅛
63-67 octane	.05⅛	.05⅜
68-70 octane (regular)	.06	.06¼
64-66 375	.05⅛	.05¼
68-70 360	.05¼	.05⅜

PENNSYLVANIA (inland refineries)—

58-60 U. S. Motor:		
Below 60 octane		.05⅛
60-64.9 octane		.06⅜
65-70 octane		.07
64-66 375		.05⅜
68-70 350		.06

CALIFORNIA (domestic movement)—

54-58 U. S. Motor	.06	.07
58-60 400	.07	.07⅛

GULF COAST (domestic)—

U. S. Motor, below 60 octane:	
*New York (Bayonne)	.06⅜
Baltimore	.06⅜
U. S. Motor, 60-64.9 octane:	
*New York (Bayonne)	.07
Philadelphia	.07
Boston	.07
Baltimore	.06⅜
Charleston, S. C.	.06⅜
U. S. Motor, 65 and above:	
*New York (Bayonne)	.07¼
Philadelphia	.07⅛
Boston	.07¼
Baltimore	.07
Charleston, S. C.	.07

*All grades of gasoline one-eighth to one-fourth cent less for barge shipments. New York harbor prices are for New York and New England delivery. Prices for New Jersey delivery one-fourth cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
Below 60 octane	.05⅝	.05⅜
60-64.9 octane		.06
65 octane and higher	.06⅛	.06¼

Naphtha

PENNSYLVANIA (inland refineries)—

50-52 450 (blending)	.05⅛
52-54 450 (blending)	.05⅛
54-56 450 (blending)	.05⅝

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70	.02¾	.03
Grade 18-55	.03¼	.03½
Low vapor pressure grade:		
*14 lb. v.p. (max.)	.03¾	.04¼
*12 lb. v.p. (max.)	.04¾	.05

*Nominal.

NORTH TEXAS—

Grade 26-70		.02¼
Grade 18-55	.03	.03¼

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

Grade 26-70	.03⅛	.03¼

CALIFORNIA—

75-85 375-390	.05¾	.06⅛

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 i.b.p., 110 flash, 540-550 e.p.	.04¼	.04⅝
41-43 gr., 300-350 i.b.p., 110-125, flash, 500-520 e.p.	.04¼	
46-48 gr., 210-230 i.b.p., 480 max., e.p.		.05

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

41-43	.04¼	.04⅜
42-44	.04½	.04⅝

NORTH TEXAS—

41-43	.04⅜	.04½

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

41-43	.04⅜	.04⅝

ARKANSAS (Ark., N. La., Miss. del.)—

41-43	.04½	.04⅜

PENNSYLVANIA (inland refineries)—

45	.05½
46	.05⅝
47	.05⅞

CHICAGO (Based on Group 3)—

41-43	.04¼	.04⅜
42-44	.04½	.04⅝

CALIFORNIA (Pac. Coast market)—

38-40 high burning test	.03½	.05

NEW YORK (Bayonne, N. J.)—

*41-43	.04⅞

GULF COAST (domestic)—

41-43	.03⅞

*Barge price one-eighth cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

No. 1 prime white, 38-42	.03¾	.04
No. 1 straw, 38-40	.03½	.03¾
No. 2 straw, 32-36	.03⅛	.03¾
No. 2 dark, 32-36	.03	.03⅛
No. 3, 28-32	.02¾	.03
No. 3, 15 and above, 28-32	.02⅝	.02½

NORTH TEXAS—

No. 1 prime white, 38-42	.03½	.03⅝
No. 1 straw, 38-40	.03⅜	.03⅝

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

No. 2, 32-36	.02¾	.03

ARKANSAS (Ark., N. La., Miss. del.)—

No. 2, 32-36	.03½	.04
No. 3, 28-32	.03⅛	.03⅝

CHICAGO (Based on Group 3)—

No. 1 prime white, 38-42	.03¾	.04
No. 1 straw, 38-40	.03½	.03¾
No. 2 straw, 32-36	.03⅛	.03⅝
No. 2 dark, 32-36	.03	.03⅛
No. 3, zero to 15, 28-32	.02⅞	.03
No. 3, 15 and above, 28-32	.02⅝	.02½

NEW YORK (Bayonne, N. J.)—

*No. 1	.04⅞
*No. 2	.04½
*No. 4	.04¼

*Barge deliveries one-eighth to one-fourth cent under above, tankcar price.

Gas Oil and Fuel Oil

(Gas oil per gal., fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil	.02⅝	.02⅛
No. 4, 24-28	.95	1.00
No. 4, 15 and above, 24-28	.77½	.82½
No. 5	.72½	.75
No. 6	.62½	.67½
Below 18 fuel oil, industrial	.60	.65

NORTH TEXAS—

U.G.I. gas oil	.02⅝	.02⅛
No. 4, 24-28	.95	1.00
No. 5	.72½	.75
No. 6	.62½	.67½
Below 18 fuel oil, industrial	.60	.65

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

U.G.I. gas oil	.02⅞	.03
10-14 fuel oil, industrial	.70	.75

ARKANSAS (Ark., N. La., Miss. del.)—

10-14 fuel oil, industrial	.60	.65

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.02⅝	.02½
No. 4, 24-28	.95	1.00
No. 4, 15 and above, 24-28	.77½	.82½
No. 5, 18-22	.72⅛	.75
No. 6, 10-16	.62½	.67½

PENNSYLVANIA (inland refineries)—

36-40	.04¾	.04⅞

CALIFORNIA—

Los Angeles:		
30-34 gas oil, per bbl.	1.00	1.20
24 plus diesel	1.00	1.25
24 plus diesel (bunkers)	1.10	1.30
12-16 (bunkers at tidewater)	.85	.95
10-16 (cargo lots)	.80	.95
12-17 (tankcars)	.70	.95
San Joaquin Valley:		
10-18 (tankcars)	.65	.75
San Francisco:		
24 plus diesel, per bbl.	1.30	1.35
24 plus diesel (bunkers)		1.35
10-16 (bunkers)		1.00

GULF COAST—

28-30 gas oil	.03¼	.03⅝
28-30 diesel (bunkers)		1.50
Bunkers (bulk cargoes)		.80
Bunker C (bunkers)		.90

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.04¾
28-30 diesel (lighterage 6¼ plus per bbl.)		1.65
28-30 diesel (tankers)		.04½
*Bunker C (to ocean-going ships in N. Y. harbor)		1.05
Industrial fuel (tankcars)		.04

*Lighterage charge 5c bbl. additional.

Bright and Steam-Refined

OKLAHOMA (Group 3)—

Bright Stocks:		
190-200 D, 15-25		.21½
150-160 D, 0-10		.18½
150-160 D, 15-25		.18
150-160 E, 15-25		.17½
100-110 D, 0-10		.17
Steam refined:		
631 green (treated)		.13½
600 dark green (untreated)	.06	.07½

PENNSYLVANIA—

Bright Stocks (Pennsylvania grade No. 8 color, 145-50 at 510; 540-550 flash):		
10 pour test	.24½	.25
15 pour test	.23½	.24
20 pour test	.22½	.23
25 pour test	.21½	.22
Steam refined:		
600	.13½	.14
650	.14½	.15
600 Pennsylvania flash	.15½	.16
630 flash	.17½	.18
600 Warren E filtered	.15½	.16

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

Zero to 10 Cold Test:		
150-3		.10
180-3		.11¼
180-4		.10¾
200-3		.11¾
200-4		.11¼
250-3		.13¾
250-4		.13¼
280-3		.14¾
280-4		.14¼
300-3½		.15¼
400-3½		.16
100-2 paraffin oil		.05⅝
15-20 Cold Test:		
200-3		.10⅝
200-4		.10⅛
240-3		.12⅝
240-4		.12⅛
280-3		.13⅝
280-4		.13⅛

GULF COAST—

Pale Oils:		
200-3	.07	.07½
300-3	.07½	.08
500-3½	.08½	.09
750-3½	.09	.09½
1,200-3½	.09½	.09⅝
2,000-4	.09¾	.10
Red Oils:		
200-5-6	.07	.07¼
300-5-6	.07¼	.07½
500-5-6	.08	.08½
750	.08½	.09
1,200-5-6	.09	.09½

CALIFORNIA (moving to dom. market)

Pale Oils:		
100-2½-3		.06
200-2½-3		.06⅛
300-3-3½		.06⅛
400-3-4	.08½	.09⅛
450-3-4	.09⅝	.10
550-3-4	.10	.10¼
600-3-4	.10¼	.10½
Red Oils:		
200-4-5		.06
300-5-6		.06¼
350-5-6	.07	.08
400-5-6	.08	.08¼
450-5-6	.08¼	.08½
500-5-6	.08½	.09
600-5-6½	.09	.09½
700-6½ plus	.09¾	.10
750-6½ plus	.10	.10¼
900-6½ plus	.10¼	.10½

PENNSYLVANIA—

150 vis. at 750° F., color, 400-405 flash:		
Zero pour test	.19	.19½
10 pour test	.18	.18½
15 pour test	.17½	.18
25 pour test	.16½	.17
180 vis. at 70° F., 3 color:		
25 pour test	.19½	.20
200 vis. at 70° F., 3 color:		
Zero pour test	.23	.23½
10 pour test	.22	.22½
15 pour test	.21½	.22
25 pour test	.20½	.21

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (a.m.p.) w.c. scale	.02½	.02⅝

PENNSYLVANIA—(inland refineries)—

122-124 (a.m.p.) w.c. scale	.0255	.0260
124-126 (a.m.p.) w.c. scale	.0260	.0265

NEW YORK—

Wax in bags fully refined:		
123-125 (a.m.p.) wax		.0445
125-127 (a.m.p.) wax		.0455
128-130 (a.m.p.) wax		.0480
130-132 (a.m.p.) wax		.0505
133-135 (a.m.p.) wax		.0535
135-137 (a.m.p.) wax		.0560
124-126 (a.m.p.) w.s.	.0240	.0250
124-126 (a.m.p.) y.s.	.0240	.0245
Petrolatum in barrels, carload lots:		
Dark green		.01⅞
Amber	.02⅞	.03
Extra amber	.03	.03⅛
Lily white	.06⅝	.06⅞
Snow white	.07⅝	.07⅞
Cream	.05⅝	.05⅞

Export Prices

GASOLINE

GULF COAST—

U. S. Motor	.05⅝	.05⅛
60-62 400		.05½
61-63 390		.05⅝
64-66 375		.05⅝

LOS ANGELES—

U. S. Motor grades:		
53-55 octane		.04½
55-56 octane	.04½	.04⅝
65-67 octane	.04⅝	.05
67-69 octane	.05	.05⅛
Above 69 octane	.05⅛	.05½
65 and above 400 e.p.	.05½	.06

KEROSENE

GULF COAST—

41-43 prime white	.03⅞
41-43 water white	.04
44 water white	.04⅛

LOS ANGELES—

41-43 water white	.04⅜	.05⅛

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.a.s. in bbls.)—

Cylinder Stocks:		
600 Warren E	.21	.21½
600 S.R. unfiltered	.19	.19½
650 S.R. unfiltered	.19½	.20
600 flash S.R.	.20½	.21
630 flash S.R.	.23½	.24
Bright Stocks:		
8 color		.26½
6½ plus color in dilution		.26

NEUTRAL OIL

200-3 color	.26½	.27
150-3 color	.22½	.23

PARAFFIN WAX

NEW YORK (prices per pound)—

123-125 a.m.p.		.04125
125-127 a.m.p.		.0425
128-130 a.m.p.		.0450
133-135 a.m.p.		.0525
135-137 a.m.p.		.0550
Crude scale:		
124-126 w.s.	.0260	.0270
124-126 y.s.	.0240	.0245

CRUDE OIL PRICES

Oklahoma, Kansas, North Central and East Central Texas

(January 9, 1936)

East Texas*	$1.15
Van, Tex.†	1.02
Altus and Tipton, Okla.‡	1.08
Other fields (see gravity table).	

*All companies. †Pure Oil Co. ‡Gypsy Oil Co.

West Texas

Crane, Upton, Howard, Glasscock and Mitchell Counties	$ .80
Winkler County	.85
Lea County, N. Mex.	.85
Pecos County*	.85
Pecos shallow†	.75

*Shell Petroleum Co., Gulf Pipe Line Co. and Humble Oil & Refining Co. †Shell Petroleum Corp.

Note—For Humble, Magnolia and Texas Co.'s West Texas and Lea County prices see gravity table. Above prices are those of other buyers.

Rocky Mountain States

(Effective January 9, 1936)

Iles, Colo., light*	$1.06
Iles, Colo., heavy*	1.00
Greybull, Wyo.*	1.28
Torchlight, Wyo.*	1.28
Grass Creek, Wyo., light*†	1.28
Grass Creek, Wyo., heavy*†	.72
Hamilton Dome, Wyo.*	.67
Elk Basin, Wyo., light *†	1.28
Frannie, Wyo., heavy*	.72
Frannie, Wyo., light (Feb. 24, 1936)*	.78
Hogback, N. Mex.*	1.21
Pondera, Mont.* (Jan. 29, 1936)	1.05
Salt Creek, Dutton Creek and Midway, Wyo., take Stanolind's Oklahoma prices on a gravity basis.	
Big Muddy, Wyo.†	1.11
Rock Creek, Wyo.†	1.12
Artesia, N. Mex. (Dec. 1, 1933)‡	.75
Maljamar, N. Mex. (Sept. 29, 1933)‡	.75
Fort Collins and Wellington, Colo.‡ (Jan. 9, 1936)	See Note
Florence, Colo.	.98
Lance Creek, Wyo.	.86
Lost Soldier, Wyo. (Sept. 30, 1933)	.88
Hudson, Wyo. (June 2, 1931)	.65
Sunburst, Mont.	1.25
Cat Creek, Mont.	1.28
Cut Bank, Mont. (May 23, 1934)	1.45

*Stanolind Oil & Gas Co. †Ohio Oil Co. ‡Continental Oil Co.

Note—Fort Collins and Wellington are not posted, price 5 cents under quotation of Salt Creek crude of like gravity (Fort Collins 36°; Wellington 33°). *Stanolind Oil & Gas Co. †Ohio Oil Co. ‡Continental Oil Co.

Southwest Texas

(January 9, 1936)

Saxet	$ .90
Mirando	.85
Pettus	1.25
Salt Flat*	.97
Salt Flat‡	.97
Darst Creek*	.97
Darst Creek†	.97
Luling	.90
Lytton Springs	1.00
Duval County	.85

*Humble Oil & Refining Co. †Magnolia Petroleum Co., Gulf Pipe Line Co. and Texas Co. ‡Shell Petroleum Corp. Saxet posted by Humble and Texas; Mirando by Humble and Magnolia; Pettus by Humble; Salt Flat by Humble; Luling and Lytton Springs by Magnolia; Duvall by Texas Co.

Middle Western States

OHIO OIL CO.

Lima (Jan. 10, 1936)	$1.25
Illinois (Jan. 9, 1936)	1.23
Princeton, Ind. (Jan. 9, 1936)	1.23
Midland, Mich. (Jan. 13, 1936)*	1.32
West Branch, Mich. (Jan. 14, 1936)	1.16
Muskegon, Mich.	1.00
Eastern Kentucky:	
Big Sandy River (Jan. 9, 1936)	1.30
Kentucky River (Jan. 9, 1936)	1.38
Western Kentucky (Jan. 9, 1936)	1.23

*Posted by Pure Oil Co. and Simrall Corp. and includes Greendale, Porter, Beaverton and Crystal crudes. West Branch, Mich., by Simrall Corp. Eastern Kentucky crude purchased by Ashland Refining Co., Ashland, Ky. Oceana posted by Old Dutch Refining Co. and Naph-Sol Refining Co.

Gulf Coast

(January 9, 1936)

Cleveland, Tex.	$1.10
Hardin, Tex.	1.03
Greta, Tex.	.90
Refugio, Tex., heavy	.90
Tomball, Tex.	1.30
LaFitte, La.	1.12
Livingston, Tex.	1.15
Bosco, La. (Jan. 16, 1936)	1.05
Evangeline, La.	1.07
Welsh, La.	.96

Cleveland and Hardin by Magnolia; Greta by Texas Co.; Refugio by Humble; Tomball by Humble and Magnolia; LaFitte by Texas Co.; Bosco by Pure; Evangeline and Welsh by Stanolind Oil & Gas Co.; Livingston by Shell Petroleum Corp.

North Louisiana and Arkansas

Smackover, all grades (Jan. 10, 1936)*	$.75
Smackover, all grades (Jan. 9, 1936)†	.80
Tullos and Urania (Jan. 10, 1936)	.97
Nevada, Ark. (Jan. 10, 1936)	.65
El Dorado East Field (Jan. 16, 1936)	.75
Converse, Holly, Pleasant Hill and Zwolle (Jan. 10, 1936)*	1.10
Lisbon, Ark. (Jan. 10, 1936)*	1.10
Elm Grove, La. (Jan. 10, 1936)	.80

*Standard Oil Co. of Louisiana, Gulf Refining Co., Louisiana Oil Refining Co., Texas Co. (effective January 14) and Magnolia Petroleum Co. (effective January 16). Urania by H. L. Hunt Co. and Louisiana Oil Refining Co. Nevada by Standard of Louisiana. El Dorado East field by Magnolia Petroleum Co. Phillips Petroleum Co. (effective January 17), posts 75 cents for all grades in Union and Ouachita Counties, Arkansas.

Eastern States

TIDE WATER PIPE CO.
(Effective Jan. 13, 1936)

Bradford, Pa.	$2.45
Allegany, N. Y.	2.45

SOUTH PENN OIL CO.
(Effective Jan. 13, 1936)

Pennsylvania Grade Oil in National Transit Lines (Bradford field)	2.45
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	2.17
Pennsylvania Grade Oil in Eureka Pipe Line lines	2.12
Pennsylvania Grade Oil in Buckeye Pipe Line lines	1.97
Corning Grade Oil in Buckeye Pipe Line Co.'s lines	1.42

PENNZOIL CO.
(Effective Jan. 13, 1936)

Pennsylvania Grade Oil in National Transit Lines:	
Group A	2.42
Includes Cochran, Franklin, Hamilton and Doolittle districts.	
Group B	2.41
Includes Titusville district.	
Group C	2.40
Includes Turkey and Tidioute districts.	
Group D	2.39
Includes Bear Creek and Porkey districts.	
Group E	2.36
Includes Eldeneau, Bull Creek, Rough Run, Carbon, Dipner, Bredlin, McJunkin, Jameson, Kenerdell, Emlenton, Tiona, Lacey and Kinzua districts.	

Price depends on lengths of pipe line haul to plant at Oil City.

PURE OIL CO.
(Effective Jan. 13, 1936)

Cabin Creek, W. Va.	$2.12
Bradford Hollow, W. Va.	2.12
Kelly Creek, W. Va.	2.12

Canada

Ontario (Sept. 9, 1933):	
Petrolia*	$2.10
Oil Springs	2.17
Turner Valley (Feb. 3, 1936):†	
Clear naphtha	2.70
Discolored naphtha	2.46
Crude oil, 50 gravity	2.32
Crude oil, 45 to 49.9	2.12
Crude oil, 40 to 44.9	1.55

*Imperial Oil, Ltd. †Imperial Oil, Ltd., and Regal Oil & Refining Co.

Mexico

Panuco*	$ .74

*F.o.b. ship, based on April transactions and exclusive of production and export taxes and bar dues.

Phone Line to Oil Field

ATHENS, Tex., May 18.—To serve oil company offices in the North Cayuga field, Henderson County, the Gulf States Telephone Co. is completing a 25-mile line from Malakoff.

Crude Prices by Gravities

Gravity—	Oklahoma, Kansas, and Salt Creek, Wyo.	Central and North Texas	East Central Texas	North Louisiana, Arkansas	Gray County, Texas	Carson and Hutchinson Counties, Texas	Conroe, Texas	West Texas and Lea County, New Mexico	Gulf Coast, Texas and Louisiana	Anahuac and Dickinson, Texas	Iowa and Cameron Meadows, Texas
Below 20	....	....	....	....	....	....	....	....	$.92	....	$.82
20-20.9	....	....	....	....	....	....	....	....	.94	....	.84
21-21.9	....	....	....	....	....	....	....	....	.96	....	.86
22-22.9	....	....	....	....	....	....	....	....	.98	....	.88
23-23.9	....	....	....	....	....	....	....	....	1.00	....	.90
24-24.9	....	....	....	....	....	....	....	....	1.02	....	.92
Below 25	$.86	....	....	$.78	....	....	....	....	....	....	....
25-25.9	.88	....	....	.80	....	....	....	....	1.04	....	.94
26-26.9	.90	....	....	.82	....	....	....	....	1.06	....	.96
27-27.9	.92	....	....	.84	....	....	....	....	1.08	....	.98
28-28.9	.94	....	....	.86	....	....	....	....	1.10	....	1.00
Below 29	.94	$.84	$.91	....	....	....	....	$.75	....	....	....
29-29.9	.96	.86	.93	.88	....	....	....	.76	1.12	....	1.02
30-30.9	.98	.88	.95	.90	....	....	....	.78	1.14	$1.04	1.04
31-31.9	1.00	.90	.97	.92	....	....	....	.80	1.16	1.06	1.06
32-32.9	1.02	.92	.99	.94	....	....	....	.82	1.18	1.08	1.08
33-33.9	1.04	.94	1.01	.96	....	....	....	.84	1.20	1.10	1.10
34-34.9	1.06	.96	1.03	.98	....	....	....	.86	1.22	1.12	1.12
Below 35	....	....	....	....	$.86	$.81	....	....	....	....	....
35-35.9	1.08	.98	1.05	1.00	.88	.83	$1.24	.88	1.22	1.14	1.12
36-36.9	1.10	1.00	1.07	1.02	.90	.85	1.26	.90	1.22	1.16	1.12
37-37.9	1.12	1.02	1.09	1.04	.92	.87	1.28	.90	1.22	1.18	1.12
38-38.9	1.14	1.04	1.11	1.06	.94	.89	1.30	.90	1.22	1.20	1.12
39-39.9	1.16	1.06	1.13	1.08	.96	.91	1.32	.90	1.22	1.22	1.12
40 and over	1.18	1.08	1.15	1.10	.98	.93	1.34	.90	1.22	1.24	1.12

Magnolia Petroleum Co. in the East Central Texas field pays 7 cents per barrel less than above posted prices in that field.

STANDARD OIL CO. OF CALIFORNIA

Crude oil prices at the well effective March 7, 1936

Gravity—	Signal Hill (Long Beach)	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda-Brea Canon	Athens-Rosecrans	Dominguez	Fiwood Terrace	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	Mountain View	Elk Hills	Buena Vista Hills Midway-Sunset except Lakeview Area	Lakeview Area	Lost Hills	Coalinga	Wheeler Ridge	Kettleman Hills
14-14.9	$.80	$.79	$.74	$.78	$.79	$.80	$.76	....	....	....	$.80	$.76	$.76	$.77	$.78	....	....	$.65	$.70	$.65	$.70	$.70	....	....
15-15.9	.80	.79	.74	.78	.79	.80	.76	....	....	....	.80	.76	.76	.77	.78	....	....	.65	.70	.65	.70	.70	....	....
16-16.9	.80	.79	.74	.78	.79	.80	.76	....	....	....	.80	.76	.76	.77	.78	....	....	.65	.70	.65	.70	.70	....	....
17-17.9	.80	.79	.74	.78	.81	.80	.76	....	....	....	.80	.76	.76	.77	.78	....	....	.65	.70	.65	.70	.70	....	....
18-18.9	.80	.79	.74	.78	.84	.80	.78	....	....	....	.82	.76	.76	.77	.78	....	....	.65	.70	.65	.70	.70	....	....
19-19.9	.82	.79	.74	.82	.87	.84	.81	....	....	....	.85	.76	.78	.77	.78	....	$.70	.66	.74	.66	.74	.71	$.70	....
20-20.9	.85	.79	.74	.85	.90	.88	.84	....	....	....	.88	.78	.82	.77	.80	....	.70	.68	.78	.68	.78	.72	.70	....
21-21.9	.88	.79	.74	.89	.93	.93	.88	....	....	....	.91	.80	.85	.77	.84	$.78	.72	.71	.82	.71	.82	.74	.70	....
22-22.9	.92	.82	.74	.92	.96	.98	.92	....	....	....	.93	.84	.89	.79	.88	.78	.77	.74	.87	.74	.86	.78	.72	....
23-23.9	.95	.86	.77	.96	.99	1.02	.96	$.84	$.79	....	.96	.88	.93	.82	.92	.78	.80	.77	.92	.77	.90	.82	.76	....
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	....	.99	.91	.96	.85	.96	.82	.84	.80	.97	.80	.94	.86	.79	....
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	....	1.02	.95	....	.89	.99	.86	.88	.83	1.01	.83	.98	.90	.82	....
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	....	1.05	.98	....	.92	1.03	.90	.91	.86	1.06	.86	1.02	....	....	....
27-27.9	1.10	1.05	.88	1.11	1.12	....	1.10	1.03	.88	....	....	1.02	....	.96	1.06	.95	.95	.88	1.10	.88	1.06	....	....	....
28-28.9	1.14	1.10	.90	1.14	1.16	....	1.14	1.07	.90	....	....	1.06	....	.99	1.10	.99	.99	.91	1.15	.91	1.10	....	....	....
29-29.9	1.17	1.15	.93	1.18	1.18	F.O.B.	1.17	1.12	.93	....	....	1.09	....	1.03	1.14	1.03	1.02	.94	1.20	.94	1.14	....	....	....
30-30.9	1.21	1.19	.95	1.22	1.21	our	1.21	1.17	.95	F.O.B.	....	....	....	1.07	1.17	1.08	1.06	.97	1.25	.97	1.18	....	....	....
31-31.9	....	....	....	....	1.24	Pipe	1.24	1.22	.97	Ship	....	....	....	1.11	1.21	1.12	1.09	.99	1.29	.99	....	....	....	....
32-32.9	....	....	....	....	1.27	Line	1.27	1.27	1.00	....	....	....	....	1.14	1.25	1.16	1.13	1.02	1.34	1.02	....	....	....	....
33-33.9	....	....	....	....	....	....	....	1.32	....	$1.28	....	....	....	1.18	1.28	1.20	1.17	1.04	1.38	1.04	....	....	....	$1.19
34-34.9	....	....	....	....	....	....	....	1.37	....	1.32	....	....	....	1.22	1.32	1.25	1.20	....	....	....	....	....	....	1.23
35-35.9	....	....	....	....	....	....	....	1.42	....	1.35	....	....	....	1.25	....	1.29	....	....	....	....	....	....	....	1.27
36-36.9	....	....	....	....	....	....	....	1.46	....	1.39	....	....	....	1.29	....	1.33	....	....	....	....	....	....	....	1.31
37-37.9	....	....	....	....	....	....	....	1.51	....	1.43	....	....	....	1.32	....	1.37	....	....	....	....	....	....	....	1.35
38-38.9	....	....	....	....	....	....	....	1.56	....	....	....	....	....	1.36	....	1.42	....	....	....	....	....	....	....	1.39
39-39.9	....	....	....	....	....	....	....	1.61	....	....	....	....	....	1.40	....	....	....	....	....	....	....	....	....	1.43
40-40.9	....	....	....	....	....	....	....	1.66	....	....	....	....	....	1.43	....	....	....	....	....	....	....	....	....	....

Newhall, McKittrick, Kern River and Round Mountain 70 cents for all grades. Kern Front 70 cents for all grades.

Market Record of Active Oil Stocks Listed on New York Stock Exchange

Compiled by Carl H. Pforzheimer Co., 25 Broad Street, New York City, Members New York Stock Exchange and New York Curb Exchange

1936 High	1936 Low	Week ended May 16 Sales	High	Low	Close	Stocks—	Total shares outstanding	Par value	Dividend rate	Payable or last paid	Dividends paid in 1935	1935 High	1935 Low	1934 High	1934 Low
125½	75	2,900	98	91¾	95	Amerada Corp.	788,675	N.P.	50cQ	4-30-36	$2.00	80	48½	55⅝	39
35⅛	27⅛	7,700	29½	27⅞	29⅛	Atlantic Refining	2,664,904	$25	25cQ	6-15-36	1.00	28	20½	35¼	21½
20	14⅛	17,100	18¼	17⅛	17¾	Barnsdall Corp.	2,131,090	$5	15cQ†	5-1-36	‡.20	14¾	5⅞	10	5⅞
21⅝	14	59,000	18⅞	16½	18⅞	Columbia Gas & Elec.	11,610,036	N.P.	20c	5-15-36	.20	15¾	3⅜	19¼	6⅝
15¼	11½	29,800	12¾	11⅜	12⅝	Consolidated Oil Corp.	13,983,287	N.P.	25c	4-7-36	.25	12¼	6½	14¼	7¼
38½	29⅛	10,100	32½	30¾	32½	Continental Oil of Delaware	4,682,671	$5	25c	7-31-36	.62½	35	15⅛	22¾	15¾
34¾	22	2,400	26	24¾	25¾	General Asphalt	387,149	$10	25c	12-17-35	.25	22½	11¾	23½	12
12¼	6⅜	6,700	9¼	8⅝	8⅞	Houston Oil (new)	1,098,618	$25	...	10-17-30	....	7	1½	5⅝	2½
23	17¼	9,900	20¾	19	19⅞	Mid-Continent Petroleum	1,843,872	$10	40cSA	6-1-36	.40	20½	9½	14¾	9⅛
40	19⅞	4,200	35⅞	31⅜	35	National Supply of Delaware	382,591	$25	....	5-15-31	....	20⅞	9	21⅛	10
17½	12½	8,600	14¼	13⅜	13½	Ohio Oil Co.	6,563,377	N.P.	25cSA	6-15-36	.30	14¼	9¼	15⅞	8½
18	11⅜	800	14	13⅝	14	Pacific Western Oil	1,000,000	N.P.	40c	11-30-34	.25	14	6¾	9⅝	5½
4¼	1⅜	400	2⅞	2½	2½	Panhandle P. & R.	198,770	N.P.	...	...	....	1⅞	½	2½	⅝
49⅜	38⅛	14,600	42⅞	41	42¾	Phillips Petroleum	4,152,836	N.P.	50cQ¶	6-1-36	1.25	40	13¾	20¾	13⅜
16½	11⅞	11,300	14¾	13½	14⅜	Plymouth Oil Co.	1,050,000	$5	25c	3-30-35	.25	13	6½	16¾	7¼
24⅞	16⅝	29,400	19⅜	18½	19⅜	Pure Oil Co.	3,038,370	N.P.	....	9-1-30	....	17	5⅞	14⅞	6⅛
57⅝	48⅜	1,100	57⅜	56½	57¼	Royal Dutch N. Y. shares	fl. 503,642,000	fl. 100	$1.70	8-1-35	1.70	48½	29½	39⅛	28⅝
43⅝	32¼	3,200	35	33½	33⅝	Seaboard Oil of Delaware	1,244,283	N.P.	25cQ	6-15-36	1.00	36⅞	20¾	38⅜	20¾
19¼	14⅜	13,900	18	17⅜	17⅜	Shell Union Oil	13,070,625	N.P.	....	6-30-30	....	16½	5½	11½	6
120	110½	1,000	116½	115½	115¾	Shell Union Oil pfd.	400,000	$100	....	7-1-31	....	111	63⅛	89	57
6¾	4⅝	7,000	5⅜	4⅞	5¼	Simms Petroleum	461,698	$10	1.00 liq.	1-27-36	11.75 liq.	18¾	4⅜	17⅛	7⅛
31½	19½	2,200	25	22⅞	25	Skelly Oil	1,008,514	$15	....	12-15-30	....	20½	6½	11½	6
17	12⅞	47,100	13⅛	12⅞	13	Socony-Vacuum	31,151,075	$15	20cSA	3-16-36	.30	15⅜	10⅝	19⅞	12½
47⅝	37	13,600	38⅞	37¾	38⅜	Standard Oil of California	13,014,754	N.P.	25cQ†	6-15-36	1.00	41⅛	27¾	42⅞	26½
40⅛	32¾	10,100	35½	34½	34⅞	Standard Oil (Indiana)	15,215,677	$25	25cQ†	6-15-36	1.00	33⅜	23	32¾	23¼
30	25	300	25	25	25	Standard Oil of Kansas	200,000	$10	50cQ	10-31-34	....	32	20	41	26
70	51⅛	27,900	61⅝	58⅜	61	Standard Oil of New Jersey	25,856,081	$25	75cSA¶	6-15-36	‖1.25	52⅜	35¾	50⅛	39¼
91	72	400	80	79	80	Sun Oil	1,733,013	N.P.	25cQ	6-15-36	$1 & 7% Stk.	77	60½	74¼	51½
39½	28⅞	17,100	34¾	32¾	34½	Texas Corp.	9,340,069	$25	25cQ	7-1-36	1.00	30¼	16½	29⅜	19⅝
15¼	7½	7,600	11¼	9⅜	10½	Texas Pacific Coal & Oil	880,703	$10	....	12-31-29	....	9¼	3¼	6½	2½
19⅛	14¾	9,400	16⅞	15¾	16½	Tide Water Associated	5,642,342	N.P.	15cQ	6-1-36	....	15⅞	7⅝	14⅜	8
106½	100⅝	1,300	105	104¼	105	Tide Water Associated pfd.	626,221	$100	$1.50Q	4-1-36	$6.50	104½	84	87	64½
28½	20⅞	4,500	23¾	22⅝	23½	Union Oil of California	4,386,070	$25	25cQ	5-9-36	1.00	24	14⅜	20½	11½
31⅝	22⅝	1,300	24⅞	24¼	24⅜	Union Tank Car Co.	1,200,000	N.P.	30cQ	6-1-36	1.20	26½	20⅞	25¾	15⅝
5¼	2¾	3,800	4⅜	4¼	4⅝	Wilcox Oil & Gas	424,839	$5	....	5-10-28	....	3⅛	1	5¾	2

•Ex-dividend. †Plus extras. ‡Also 50 per cent in stock of Barnsdall Ref. §Partly on account of accumulation. ‖Dividend 4/75 Mission Corp. paid 3-15-35. ¶Includes extras.

Market Record of Active Oil Stocks Listed on New York Curb

Compiled by Carl H. Pforzheimer Co., 25 Broad Street, New York City, Members New York Stock Exchange and New York Curb Exchange

1936 High	1936 Low	Week ended May 16 Sales	High	Low	Close	Stocks—	Total shares outstanding	Par value	Dividend rate	Payable or last paid	Dividends paid in 1935	1935 High	1935 Low	1934 High	1934 Low
20¼	13¼	2,100	16⅛	15⅜	15⅜	Bridgeport Machine Co.	150,000	N.P.	....	5-1-30	....	14⅛	3¾	3¾	⅛
50	39¾	50	42	42	42	Buckeye Pipe Line Co.	200,000	$50	75cQ	6-15-36	$3.00	42½	30½	38	26
4⅞	2½	4,200	3⅞	3⅝	3⅝	Carib Syndicate	799,020	25c	....	.....	....	4¼	1⅝	5½	1⅛
124¾	105	400	109	105	108¼	Chesebrough Mfg. Co.	120,000	$25	$1Q†	3-31-36	6.50	157	115	150	116
7⅜	3	32,800	4⅝	4⅜	4½	Cities Service	37,804,394	N.P.	....	6 1 32	....	3¼	¾	4¼	1¼
4	1⅛	9,100	2¼	2	2	Colon Oil	2,200,000	N.P.	....	.....	....	2⅛	½	3¼	⅛
4⅛	1½	1,200	2⅝	2⅜	2½	Cosden Oil	399,687	$1	....	.....	....	1½	¼	3⅞	½
34¾	19⅞	4,300	28¼	27⅜	28	Creole Petroleum	6,974,356	$5	20c	12-31-35	.20	23¾	10	14⅜	9⅝
12	9	800	10½	10	10	Darby Petroleum	509,696	$5	25cSA	1-15-36	.50	8⅞	4	7½	4⅛
4⅜	1⅞	No sales ..	..	..	..	Derby Oil & Refining	263,162	N.P.	....	... ..	....	2	¾	2¼	1
44	39	No sales ..	..	..	..	Eureka Pipe Line	50,000	$50	$1Q	5-1-36	4.00	38	33¼	37	30
98	72	5,800	84¼	81⅝	82¼	Gulf Oil Corp.	4,538,101	$25	25c	4-1-36	....	74¾	50¼	76¾	49¾
76½	57⅝	7,300	61½	57⅝	60	Humble Oil & Refining (new)	8,923,935	N.P.	25cQ	4-1-36	1.25	64	44	49½	33¼
24½	20	11,100	23	21⅜	22½	Imperial Oil of Canada	26,919,871	N.P.	62½cSA†‡	6-1-36	1.25	22½	15⅜	17⅞	12⅝
9¼	5½	100	6¾	6¾	6¾	Indiana Pipe Line	300,000	$10	20cSA	5-15-36	.35	6⅛	3⅝	6⅞	3⅝
39⅝	33½	7,200	38⅛	36⅞	37⅞	International Petroleum	14,247,088	N.P.	$1.25†‡	6-1-36	2.50	39¾	28	33⅜	19⅜
15⅜	9⅞	10,200	14⅝	13⅜	14	Louisiana Land & Exp.	3,000,000	N.P.	10cQ	3-16-36	.10	11⅜	4⅜	5	2⅛
15	7⅜	300	11⅛	10½	11	Lion Oil Refining	270,000	N.P.	....	10-27-30	....	8¼	3½	6	3⅜
14¼	9⅞	2,300	12½	11¾	12½	Lone Star Gas	5,382,723	N.P.	20cSA	2-15-36	.30	10⅞	4½	8⅜	4¼
8⅜	5	1,600	6	5⅞	6	Mountain Producers	1,682,182	$10	30cSA	12-31-35	.90	5⅜	4⅛	5½	4
23	17¾	3,600	18⅝	17¾	18½	National Fuel Gas	3,810,183	N.P.	25cQ	4-15-36	1.25	20	11¾	18⅛	13⅛
15¾	10	800	10⅝	10¼	10½	National Transit	509,000	$12.50	40cSA	6-15-36	.75	10⅝	6¾	9½	7
4½	2⅞	No sales ..	..	..	..	New Bradford Oil	1,445,202	$5	10cSA	5-15-36	.20	3¼	2	2½	1⅝
6⅝	1⅝	700	3⅞	3½	3⅞	New Mexico and Arizona	1,000,000	$1	....	.....	....	2½	1	2¾	1
6¼	4½	No sales ..	..	..	..	New York Transit	100,000	$5	15cSA	4-15-36	.30	4⅞	3	4¾	3
9¼	5¼	1,300	6⅝	5¼	5¼	Northern Pipe Line	120,000	$10	15cSA	7-1-36	.50	8	5¼	7	4⅝
6⅝	3¼	20,600	6⅛	5⅞	5⅞	Pantepec Oil	1,608,700	N.P.	....	.....	....	4⅜	1¼	2⅝	⅞
19¼	4½	4,500	16¼	14⅞	15⅞	Root Petroleum Co.	336,045	$1	....	.....	....	5	1½	....	....
4¾	1⅞	1,200	4	3½	3⅝	Ryan Consolidated	296,931	N.P.	...	.	....	2½	⅝	3⅜	⅞
10	7	1,300	8	7½	8	Salt Creek Producers	1,496,859	$10	40cSA	6-30-36	1.20	7½	5½	7⅞	5½
40½	32½	1,300	35	34½	35	South Penn Oil	1,200,000	$25	50c†	3-31-36	1.35	34½	21⅝	26½	17½
7⅞	4⅜	100	5¼	5¼	5¼	Southern Pipe Line	100,000	$10	15cSA	3-2-36	.30	5	3⅞	5½	3½
56	54	No sales ..	..	..	..	Southwest Penna. Pipe Lines	35,000	$50	$1Q	4-1-36	5.00	56	44¼	47	41
23⅜	17⅛	1,900	17⅝	17¼	17⅝	Standard Oil of Kentucky	2,604,790	$10	25cQ	3-16-36	1.25	24	18	18⅜	14⅝
14⅝	11½	200	12½	12¼	12½	Standard Oil of Nebraska	188,403	$25	....	6-20-34	....	12	7¾	16⅞	8¼
36¼	21¾	4,800	30⅛	29	29½	Standard Oil of Ohio	753,740	$25	....	1-3-33	....	23⅝	11½	28½	12¼
5	2⅝	14,300	4⅜	4½	4½	Sunray Oil	1,610,810	$1	....	4-15-31	....	2⅞	⅞	2	⅟₃₂
9¾	6	1,900	6½	6¼	6½	Texon Oil & Land	336,028	N.P.	15cQ	3-31-36	.60	6⅞	5	11	4⅜
7½	4⅜	4,200	5⅝	5¼	5⅜	Texas Gulf Producing Co.	888,076	N.P.	...	12-29-34	....	4¾	2½	7	3⅝

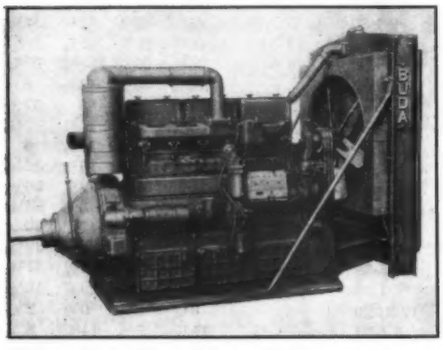
•Ex-dividend. †Includes extras. ‡Payable in Canadian funds.

Note.—In comparing highs and lows for the several years in the two tables, it will be necessary to take into consideration cases where there have been stock split-ups.

NEW OR IMPROVED EQUIPMENT

Governed Combustion Feature of New Buda Diesel Engine

The Buda-Lanova diesel engine, announced by the Buda Co., Harvey, Ill., employs a cylinder-head which produces "soft combustion," attained through increased turbulence and controlled combustion, accomplished principally by use of an auxiliary



air-chamber called the "energy cell." The rate of pressure rise is well within the limits of gasoline-engine practice. Maximum pressures are not over 625 pounds per square inch. The compression ratio also is comparable to that of a gasoline engine, being between 12.5 to 1 and 13.2 to 1. The unusual and controlled turbulence develops a high workable mean effective pressure.

Buda-Lanova diesels, the manufacturer says, provide through controlled combustion: Lower compression ratios, lower maximum cylinder pressures, high mean effective pressures, lower specific weight, lower rate of pressure rise, lower exhaust temperatures, smoother operation, cleaner combustion, lower fuel cost and maximum power per cubic inch displacement.

Bulletins, Booklets and Other Literature for the Trade

Smith Devices, 2245 North Twelfth St., Philadelphia, Pa., is sending on request a bulletin describing and illustrating two new safety devices for the oil fields, an adjustable sling grip for handling barrels and oil drums and a cable- and rod-grip for connecting pumping-rods.

The Titusville Master tank-heater, announced by the Titusville Iron Works Co., Titusville, Pa., is the subject of a bulletin which may be obtained from that company.

Edward nonreturn valves are the subject of an attractive 28-page catalog, designated as No. 11-B, prepared by the Edward Valve & Manufacturing Co., Inc., East Chicago, Ind.

A catalog on all kinds of chain, welded and weldless, is announced by the Columbus-McKinnon Chain Corp., Tonawanda, N. Y. It gives precautions to prevent undue strain and stress, what types of chain, hooks, shackles, etc., to use for different jobs, etc.

An illustrated pamphlet, "Instant Death to Any Fire," obtainable from Walter Kidde & Co., Inc., 140 Cedar Street, New York, describes various sizes of carbon dioxide portable fire-extinguishing equipment.

A 128-page catalog describing spur, bevel, worm and other gears, also motorized speed reducers, etc., manufactured by the Ohio Gear Co., 1333 East 179th St., Cleveland, Ohio, is available on request. It gives data on gearing, S.A.E. standard heat-treatment methods, and other facts.

Geo. S. Mepham Corp., manufacturer of Colox and Colox products, announces Chemical "Z" to the oil country trade through a two-color folder. Chemical "Z" is designed to improve control of jell and viscosity in rotary drilling fluids.

Company engineers interested in aerator type cooling towers will find valuable information in a bulletin released by the Fluor Corp., Ltd., Los Angeles, Calif., which contains illustrations, descriptive matter and engineering data on the aerator type tower.

High-voltage power transformers, the subject of an attractive 12-page bulletin released by Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Fourteen features of design are emphasized.

Men Widely Known in the Equipment Field

Howard F. (Mike) Ryan, district manager for Gardner-Denver Co. in Oklahoma and Kansas, has opened a new warehouse at 309 South Cincinnati Avenue, Tulsa. Mr. Ryan, who began work in West

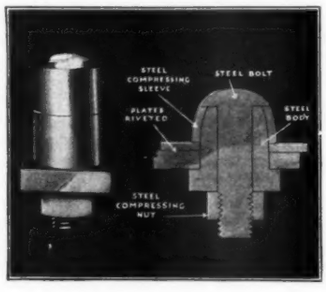
HOWARD F. (MIKE) RYAN

Virginia oil fields, went to Burkburnett in 1918 and to Tulsa in 1924. He has been district manager for Gardner-Denver since 1930.

Working out of the Tulsa office in addition to Mr. Ryan are: R. J. Bauer, special representative, who divides his time between the Dallas and Tulsa offices; O. E. Devey, of the rock drill division; R. Heckenkamp, service man, and F. H. Lewis in charge of the warehouse, with C. I. White, regional manager of the oil field district, with headquarters in Houston. The Gardner-Denver Co. handles steam power and centrifugal pumps, steam engines for rotary drilling, water- and air-cooled compressors, rock drills and accessories.

Rivet Is Inserted and Fastened From One Side of the Job

A mechanical all-steel rivet, inserted and fastened from one side of the job with a wrench, giving the strength of a regular bolt or rivet, has been put on the market by Multi-Seal Manufacturing Co., 123 North Jefferson St., Chicago. Riveting jobs that are not accessible from both sides can be accomplished from one side by inserting the mechanical rivet and drawing down on the



nut, forming a solid steel rivet head on the inside.

A one-piece steel body consists of a heavy steel cylinder with a square head at one end. The other end has a taper valve seat, which sets in a steel expansion and compressing ferrule. A steel bolt goes through the center with its head under the steel compressing ferrule and the nut at the other end which compresses and expands the steel ferrule, when turned down.

The device is used for riveting steel girders, sheet metal of all kinds, machinery, boiler seams, metal castings, plates on metal containers, pipes and various manufactured products, and is of importance to steel construction.

New Duplex Hose

A rubber tubing, or hose, of new construction has been placed on the market, especially designed for welding equipment and similar services. Twin hose are simultaneously molded with a connecting web between them, so that a cross-section resembles the figure 8. A single length of this nonkinking hose is all that is necessary for equipment which heretofore has required two separate lengths. A special cord-wound reinforcement is installed between the first and second braid, giving it a higher burst limit. With the quarter-inch size the burst is 2,000 pounds. This construction permits the use of differing pressures in each side without torque or writhing. Super Siameez is the trade-name adopted by the manufacturers, Electric Hose & Rubber Co., Wilmington, Del.

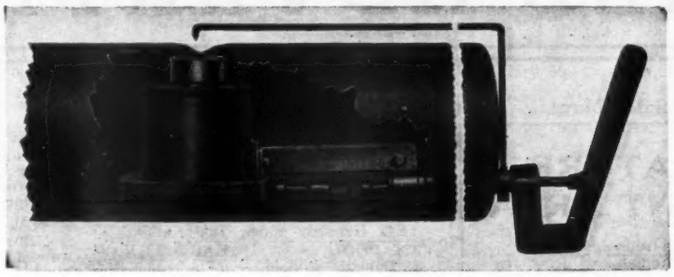
Oxweld Cutting Attachment

A new oxy-acetylene cutting attachment, the Oxweld type CW-22, has been announced by the Linde Air Products Co., 30 East Forty-second Street, New York. This attachment can handle light sheet metal as well as all but the heaviest work at speeds and efficiency equal to those of the full-size cutting blowpipe, according to the company. It operates on low-pressure or medium-pressure acetylene, with equally satisfactory results. Severe field tests are said to have proved its capacity, stability and endurance.

Northern Equipment Co., Erie, Pa., manufacturer of the Copes system of boiler-feed control, has appointed C. H. Tate Cleveland district representative, with an office in the Hunkin-Conkey Building, Cleveland.

IT REMOVES THE DENTS FROM OLD PIPE AND CASING

The New Deal Specialty Co., Okmulgee, has supplemented its line of pipe-cleaning and pipe-straightening equipment with another product of value for those who desire to recondition used pipe for replacement in service or for resale. It is the New Deal "De-Denter," a device which, according to the manufacturer, provides an easy, rapid and simple method of removing the dents from pipe and casing.



With this device an operator can use dented pipe over again instead of junking it, the manufacturers say. The "De-Denter" is a hand-operated unit and it is said to be easily operated or transported by one man.

Important Features Combined in New Speed Star Machine

Speed Star No. 71, a new water-well machine announced by the Star Drilling Machine Co., Akron, Ohio, is conservatively rated to handle 1,600 pounds of tools to a depth of 600 feet. According to the manufacturer it offers the following features never before combined in a single machine: Speed without line whip; shockless spudding action; telescoping mast; folding mast-braces; centralized easy-operating controls; I-beam all-steel construction, electric welded; 27 antifriction bearings; counterbalanced V-belt drive.

The No. 71 Speed Star is available in truck mounting as shown, also in a trailer model equipped with steel wheels, or with high speed wheels having solid rubber or pneumatic tires. On request the manufacturer will send Bulletin 71A, which fully describes this water-well outfit.

Here and There With Men Who Manufacture Equipment

J. S. McKeighan has been transferred by the Lincoln Electric Co. to the sales staff in Dayton, Ohio. J. B. McCormick has been transferred from the Philadelphia office to Fresno, Calif. Paul W. James has been transferred from the factory to Binghampton, N. Y.

Rector Well Equipment Co., Inc., Fort Worth, Tex., has appointed A. J. (Al) Powers as sales representative in North Louisiana and Arkansas, with headquarters at 631 Spring Street, Shreveport. For the last 25 years Mr. Powers had represented National Tube Co.

Two new agents are announced by Pennsylvania Pump & Compressor Co., Easton, Pa.: Lieb-Jackson, Inc., 337 South High St., Columbus, Ohio, will represent it in the Columbus district, and F. B. Schwartz, 1019 Washington Ave., South Minneapolis, Minn., will represent it in Minnesota and western Wisconsin.

Chain Belt Co., Milwaukee, Wis., has appointed W. A. Pitts special representative in the oil fields. He will work out of Oklahoma City, with his office at 1513 North Pennsylvania Street.

Controls Instantly Available in Titusville Tank-Heater

The Titusville Master tank-heater, announced by the Titusville Iron Works Co., Titusville, Pa., was designed by the superintendent of a large eastern refinery. It is head-operated. All controls are available instantly at the front head when heating coils must be removed or replaced. There is no risk of loss or leakage, no necessity for disturbing the tank contents.

The head-operated body valve is equipped with a small equalizing pilot which operates automatically with the main valve and assures easy action. Bevel-ground seats on both valves make for absolute tightness and prevent foreign matter from interfering with perfect closure. When open the main body valve has an orifice as large as the heater shell, permitting rapid flow of the most viscous materials.

The heater is so designed that only the material being withdrawn need be heated. This is particularly advantageous when handling wagon or tankcar lots. The saving of steam is enormous. Many products are ruined by exposure to heat for an extended period of time. High-grade cylinder oils will change color perceptibly if stored in tanks requiring continuous heat. With the Titusville Master tank-heater, only the material being withdrawn is subject to heat for a short time. No spoilage—no color change.

Improved Protectoglo System Offered by Brown Company

A new and improved line of Protectoglo equipment has been placed on the market by the Brown Instrument Co., a division of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa. This apparatus includes two distinct types of relays, and a flame sensitive electrode which can also be used as a special spark plug for electric ignition. Any of the standard line of primary controllers and motor valves are used to complete the system of combustion safeguard.

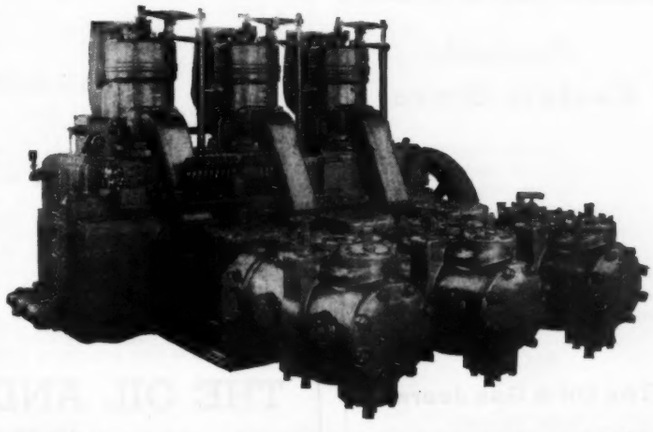
Development of this equipment follows several years of field experience with the old Protectoglo system, manufactured by the Minneapolis-Honeywell Regulator Co., which showed how utilization of the electrical conductivity of the flame itself provided safety and reliability.

The relays contain the thermionic tubes for refractionation and amplification of the power input which, when conducted from the electrode unit to ground through the flame, operates the relay units controlling the operation sequence, main fuel valve, etc. Any interruption in the circuit to ground through the flame (flame failure) causes instantaneous and positive shutdown. The cast-iron dust and moisture-proof relay cases are of the universal type for either front of board or flush mounting.

The Bristol Co., Waterbury, Conn., has appointed L. E. Mustard district manager of the company's branch office in Detroit, Mich.

CLARK DEVELOPS NEW COMPRESSOR UNIT

Recognizing the widespread demand for an engine-driven compressor which may be quickly installed and easily moved from one location to another at low expense, Clark Bros. Co. of Olean, N. Y., has announced a series of right-angle, super two-cycle machines in five sizes which range from 165 to 400 horsepower.



The new Clark "Super Right Angle" compressor is said by the manufacturers to reduce floor space, foundation, building and installation costs, as compared with the conventional horizontal compressors. This engine offers as features of particular interest the Clark super two-cycle fuel injection system, full force feed lubrication, and an entirely new method of scavenging two-cycle engines, which is said greatly to increase the power available. The running gear of this engine is readily accessible, and many new and important details of construction and design, the company says, have been incorporated.

CLASSIFIED ADVERTISING

For Sale—Maps

OFFICIAL NOMENCLATURE MAP OF MID-CONTINENT AREA

SHOWS: Oil fields in green and gas fields in red, hand-colored. Index giving location of each field and official name as designated by the various state nomenclature committees. Cities, towns, county seats and principal streams.

AREA COVERED: East portion of Colorado and New Mexico, Southwest portion of Nebraska, States of Kansas, Oklahoma and Texas, Southwest portion of Arkansas, West portion of Louisiana.

SIZE: 66" x 90" SCALE 1" = 12 miles.

This map on linen attached to heavy spring roller in dust proof steel case.

E. C. JACOBSON

Phone 4-5419 530 McBirney Building.
Tulsa, Oklahoma.

For Sale—Maps

Oilfield and County Ownership Maps. New price list on request. Send $1.00 for map of Texas and eastern New Mexico.
ZINGERY OIL MAP CO.
Fair Bldg. Fort Worth, Texas

Royalties—Production

Brokers—Salesmen

Sell in the most active area in the United States — The Permian Basin of West Texas and Southeastern New Mexico. From the standpoint of royalty investors this area has much to offer. Can supply you with choice non-producing royalties located on geophysical highs. Also drilling blocks, close in acreage to production, or wildcat leases. I maintain my own field men who cover this area for me. All offerings meet the requirements of the Securities and Exchange Commission. Inquiries invited.

B. D. BUCKLEY

Paul Brown Bldg., St. Louis, Mo.

ROYALTIES and leases in all fields, producing and nonproducing, Kans., Okla., Tex. Get my list before buying. JAMES R. HAYNES, Grantville, Kans.

MONTHLY PAYING ROYALTIES on which we have filed SCHEDULES A with the SEC at WASHINGTON. Quoted Dealers Exclusively.
W. E. COOK
Suite 812, Palace Bldg., Tulsa, Okla.

Reputable Eastern Broker

. . . . Now operating own Royalty Company, is interested in acquiring, through exchange of stock, or otherwise, royalty or operating Companies for consolidation.

Banking and trading connections of the highest. Submit complete details in confidence subject to recall to

Box H-262
The Oil & Gas Journal
Tulsa, Oklahoma

Royalties—Production

HIGH GRADE producing oil and gas royalties offered to dealers. Billie Smallwood, P. O. Box 2261, Tulsa, Oklahoma.

F. A. SANSOME
Trustee for First and Second Dependable Oil Corps.
MAINTAINS MARKET FOR DEALERS
Over $2,000,000 in producing oil royalties on hand at all times
522 Fifth Ave. New York, N. Y.

SHERIDAN and GOVE Cos., Kansas drlg. blks. Royalties, Leases, Low Prices. Mutual Oil Enterprise, Oakley, Kansas.

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma.

Bargains in Okla. and Kans. producing and nonproducing royalties. Lewis Realestate Exchange, 702 Daniels Building, Tulsa, Oklahoma.

Producing-ROYALTIES-Non-Producing Dealers Exclusively
Schedules and Engineers reports furnished
G. D. TERRIEN
412-13 Central Bank Bldg., Tulsa, Okla.

Petroleum Eng. Laboratories

GEOLOGIC STANDARDS COMPANY
1600 East 5th Place, Tulsa, Oklahoma.
Porosity-Permeability-Saturation Tests.

Royalties—Production

I BUY AND SELL oil royalties and producing wells, East Texas field. B. A. SKIPPER, Longview, Texas.

PRODUCING OIL ROYALTIES
for dealers.
H. P. BOWEN
842 Kennedy Bldg., Tulsa, Okla.

VAN POOL — EAST TEXAS
Bought — Sold — Wholesale.
W. R. Brown & Co., Inc.
14 Prospect Pl., East Orange, N. J.

Van—East Texas—Louisiana Royalties
Bought—Sold.
WILLIAM MONROE LAYTON
67 Wall St., Suite 1510, New York City.

Offerings Wanted
PRODUCING OIL ROYALTIES
(Wholesale Only)
M-K OIL COMPANY
20 Broad St., New York.

PRODUCING OIL ROYALTIES
(ALL FIELDS)
Bought, Sold and Quoted.
HENRY L. BAKER CO.
715 Van Nuys Bldg.,
Los Angeles, Calif.
Telephone Trinity 7391

OIL PRODUCTION, Royalties, Leases, Land and estimating their values, has been my work for the past 30 years, with headquarters here, but covering parts of Oklahoma and New Mexico, States of many opportunities. I offer my services and experience to investors in these lines. E. B. Reeves, Box 13, Alanreed, Gray County, Texas, or Box 475, McLean, Texas.

Financing

JAMES E. MILLER, 604 W. Seventh St., Tulsa, Okla., will aid in financial marketing problems. Fee basis.

PROSPECTUSES prepared and deals shaped up for registration or exemption under Federal Security Act. Fee basis. John Morris, Box 5411, Philadelphia, Pa.

Leases Production

320 A. in Butler Co., Pa., will lease for oil or coal, 1,000 ft. to oil; 7-ft. vein of coal; drift mining. J. W. BOUSE, 100½ W. Grand, Oklahoma City, Okla.

WILL SELL HALF OF FEE interest in 80.94 acres at Lane City, Texas, for Five Thousand Dollars, or will sell one-fourth fee interest for Twenty-five Hundred. This land is under lease by a Major; and well located in their block.
ADDRESS OWNER
at P. O. Box 548, Wharton, Texas

Leases—Production

NEW MEXICO—My weekly scout report furnishes complete and reliable information on New Mexico developments. Send for copy. W. S. Patterson, Santa Fe, New Mexico.

NEW MEXICO Oil and Gas Leases and Royalties. Also inquiries and listings wanted. F. R. WARN, Santa Fe, New Mexico.

ECTOR COUNTY Drilling Block: 960 acres short distance northwest Goldsmith pool. Sound reasons for heavy production. Wire H. B. Opp, Burnet, Texas.

LANDS, Leases, Royalties, anywhere, bought, sold. Lands, $2 acre, up. Leases 25c acre, up. Advise needs. American Investment Co., Houston, Texas.

SCOUT reports furnished on any Panhandle Oil Property, with my ideas of values, etc. Price $5.00 and up. Scouting in New Mexico and Oklahoma after May the 15th. E. B. Reeves, Box 475, McLean, Tex.

10-ACRE LEASE for sale at prevailing prices, one quarter mile from C. A. Parker's discovery well Shelby County, Tex. J. D. Taylor, DeSoto Hotel, New Orleans, La.

10,000 Acre Lease for Sale—5-year paid up in Schleicher County, Texas. Big drilling campaign just getting under way, one 12,000,000 foot gasser completed, two wells now drilling, two more to start soon. Address H. B. Opp, Burnet, Tex.

DRILLING BLOCK Young County, Texas, 100 acres top of structure; 750 ft. first oil sand; 40 gravity oil; cheap drilling near producing wells.
Roy G. Barton, Box 191, Clovis, N. Mex.

9,000-ACRE oil lease for sale, located south of Sea-Boards 12,000,000-ft. gasser in Hamilton County. H. B. Opp, Burnet, Texas.

Drilling Block—3,000 acres in Texas Permian Basin. On line between two shallow pools; Humble holds two large blocks in close proximity. Address H. B. Opp, Burnet, Texas.

WILL SACRIFICE FOR $50
A 40 acre Oil and Gas Lease in Chaves County, New Mexico. This long shot may come in and make you all the money you will ever need. Write me for particulars. Wm. Field, 413 Maple Street, Bellingham, Washington.

FOR SALE, OIL AND MINERAL RIGHTS, under lands in Eastern Colorado, leased in solid blocks, largely by major companies; taken after seismic surveys and core drillings. Titles clear. Get ready for the next big oil play. Warren Shamburg, Burlington, Colorado.

SHELBY COUNTY at last has a producing well. Several tests now going down. This County has been worked out and approved by best geologists. Have 1,000 acres on structure for drilling contract. Small bonus. C. A. Parker, Box 451, Center, Texas.

SAN JUAN Basin, New Mexico, Offering 320 acres top of structure including Midwest Discovery well, high gravity oil 1,000 feet; wonderful deal for developer or promoter.
Roy G. Barton, Box 191, Clovis, N. Mex.

OFFERING very cheap, fee and all royalty, possible oil and gas bearing territory, 20-40-80 and 160-acre tracts in Oklahoma. Billie Smallwood, P. O. Box 2261, Tulsa, Oklahoma.

Corpus Christi Field will give 1400 ac. for well, responsible party, 8 miles from big production, drill immediately, 5,800 ft. Drilling cost $15,000. C. Kleinman, Nueces Hotel, Corpus Christi, Texas.

EASTERN COLORADO—Have limited supply of oil and gas leases located in Cheyenne, Kit Carson and Yuma Counties. These leases are well located. Just think of twenty-year paid up lease for $2.50 per acre. Also have some well located royalty (non-participating) for $2.50 per acre. Can assemble a block to responsible parties in Kansas or Eastern Colorado. After the 20th of May address me at my Tulsa office, 217 West Fifth St., Tulsa, Okla. Until the 20th of May address will be New Hotel, Goodland, Kansas. W. D. McCOY.

CLASSIFIED DISPLAY RATES

Classified Display is set with a border and may be used in one or two column sizes.

1 Inch	*1 time*	*$5.00*
1 Inch	*13 times*	*4.50 per inch*
1 Inch	*26 times*	*4.00 per inch*
1 Inch	*52 times*	*3.50 per inch*

This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY

CLASSIFIED RATES

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgment is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times		1 time	2 times	3 times	4 times
3 Lines	*$1.05*	*$1.80*	*$2.25*	*$3.30*	*7 Lines*	*$2.45*	*$4.20*	*$5.95*	*$7.70*
4 Lines	*1.40*	*2.40*	*3.40*	*4.40*	*8 Lines*	*2.80*	*4.80*	*6.80*	*8.80*
5 Lines	*1.75*	*3.00*	*4.25*	*5.50*	*9 Lines*	*3.15*	*5.40*	*7.65*	*9.90*
6 Lines	*2.10*	*3.60*	*5.10*	*6.60*	*10 Lines*	*3.50*	*6.00*	*8.50*	*11.00*

We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

Special Offering of Pumps

We are offering a miscellaneous assortment of pumps which have accumulated in our stocks recently and will be sold at bargain prices for quick sale.

1—Pacific Horizontal Split Shell Centrifugal Hot Oil Pump, Size 2", capacity 215 GPM, 230 ft. hd. at 3600 RPM, double suction, water cooled jackets, steel fluid ends, type D.H.T.B. direct connected to 20 H.P., 440/220 volt, 60 cycle, 3 phase, explosion proof enclosed case, Louis-Allis 3600 RPM electric motor.

2—Pacific 8-stage solid shell pumps minimum capacity 80 bbls. per hour, 350-lb. pressure to maximum capacity 420 bbls. per hour 1000-lb. pressure, capacities calculated at 3600 RPM.

1—Byron Jackson Horizontal Split Shell Centrifugal Pump, 3x15, 4-stage Multiplex, capacity 420 GPM, 1000 ft. hd. at 1800 RPM, direct connected to 200 H.P. General Electric, type KTP, 440 volt 60 cycle, 3 phase, 1800 RPM, induction motor complete with manual control compensator, type C.R. 1034.

1—Worthington Centrifugal Pump size 5", capacity 715 GPM, 98 ft. hd. at 1160 RPM, 8" suction, direct connected to 30 H.P. General Electric type KT, 2200 volt, 3 phase, 60 cycle, 1160 RPM induction motor.

1—Worthington Duplex (piston type) Pump, size 10x12, 8" suction, 6" discharge, Serial No. 280029 direct connected to General Electric Induction Motor 25/12.5 H.P., type KT 526, 440 volts.

1—Kinney Rotary Pump, 1½" suction, 1½" discharge, 60 GPM at 1200 RPM, mounted on common base with General Electric Induction Motor, 1½ H.P., 1200 RPM, type KT 926, 440/220 volt, 60 cycle, 3 phase, No. 4719140.

1—Blackmar Rotary Pump, 6" suction, 6" discharge mounted on common base with explosion proof Louis-Allis 50 H.P., 860 RPM, type F, frame No. 505, 440/220 volt, 60 cycle, 3 phase, No. 166285 Electric Motor. Complete unit mounted on steel skids (sled type).

1—Blackmar Rotary Pump, 4" suction, 4" discharge mounted on common base with General Electric squirrel cage induction motor, 15 H.P. 900 RPM, type KT 312, 440/220 volt, 60 cycle, 3 phase, No. 2296120 electric motor. Complete unit mounted on steel skids (sled type).

EXCEPTIONAL OFFER OF KEY RETURN BEND FITTINGS

325—3½" O.D. x 8" center, plain box type return bends with projecting ear lugs to retain holding members.

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Main Office—1446 Guinotte Ave., Kansas City, Mo.

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We will erect latest type 55,000 bbl. all steel storage tanks at a great saving.

Over 500 tanks on hands from 500 bbls. to 80,000 bbls. Ready for delivery.

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FOR SALE—Approximately 12 miles 6" Screw Line Pipe, first class condition, as good as new, with recessed couplings. 8-thread. If interested wire 561 N. Court Street. Paintsville, Kentucky.

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2—150 HP Rathbun Jones Gas.
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3—300/360 HP Diesel Generating Sets.
2000 KW 4 unit Diesel Plant—Complete.

WANTED: 120/240 HP Fairbanks Diesel.

MISSISSIPPI VALLEY EQUIPMENT COMPANY
509 Locust St. St. Louis, Mo.

FOR SALE—One No. 2 Nat. drilling rig, string cable tools suitable for largest spudder; 50 H.P. gas motor. H. J. Steward, Sisterdale, Texas.

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Before disclosing your invention to anyone, send for blank form:
"Evidence of Conception."
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LANCASTER, ALLWINE & ROMMEL
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Your ad in these columns will be read by more oil minded readers than in any other medium in the world. Direct your advertising to these readers through the regular use of this service.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

FOR SALE—Air Compressor Laidlow-Dunn Gordon, 12 x 18—12 x 12 double cylinder steam driven. I. Jaffee & Sons, Dallas, Texas.

GAS LIFT compressor plant, consisting of four 90 H.P. twin cylinder, two cycle Superior gas engines direct connected to four 11 x 5½ x 16 two stage Bessemer compressors. Plant complete. Splendid condition, located in Oklahoma City field. Price and inspection upon application.

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Oklahoma City, Oklahoma.

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Spudders and Drilling Machines.
Several Steel Derricks & Rotary Equip.
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OFFICE MAN—15 years oil experience in accounting and land and lease records. Legal education. Desires connection with independent producer or Land-Tax Departments of producing company. Single, 36, reliable. Go anywhere.
ADDRESS BOX H-270
The Oil and Gas Journal, Tulsa, Okla.

GAS LIFT ENGINEER, 8 years experience, graduate, age 28, trained by major company, capable of directing a gas lift program, desires change in position. Address Box H-283, The Oil and Gas Journal, Tulsa, Oklahoma.

Experienced advertising, publicity and sales promotion man desires position. Now employed as advertising and sales promotion manager for National advertiser. Experienced in all phases of the oil industry. Address Box H-280, The Oil and Gas Journal, Tulsa, Oklahoma.

Incorporations

DELAWARE CHARTERS: Complete incorporating and organizing service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

CHARTERS — Delaware best, quickest, cheapest, most liberal. Free forms. Colonial Charter Co., Wilmington, Del.

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1—122' American Angle Iron all steel derrick. Steel Storage Tanks 10,000 to 80,000-barrel capacity. Steel Sheets 3/16" to ½" included all sizes. Guaranteed like new. Immediate shipment and very low prices on all these items.
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K. C. PIPE & SUPPLY CO.
Boulder at Cameron Tulsa, Okla.

25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor, Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list. Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO.
26 West 2nd St. Cincinnati, Ohio

Business Opportunities

GEOLOGIST desires connection on percentage basis plus expenses. Highest credentials. Address Box G-823, The Oil and Gas Journal, 415 Lexington Avenue, New York City.

WANTED—Responsible party's help in development of 200-acre lease, West Branch, Mich. field. Proven territory. Offset well to drill. Straight ⅛th royalty. Best investment in State. Good proposition to right party.
Address Box 215, Alma, Mich.

Financial participation assembling blk. of 15,000 acres, on good structure north eastern New Mex. Block can be assembled very cheap. Box 55, Dumas, Texas.

Equipment Wanted

WANT to buy for salvage, abandoned properties in any field or line pipe or casing on top of ground.
E. K. SUPPLY COMPANY
Ketchum Hotel, Tulsa, Oklahoma.

WANTED power driven slush pump. State capacity and working pressure, two thousand feet of 4 inch or larger drill pipe and slips. State size and weight. Nineteen inch or larger rotary, table, steel derrick, state heighth, etc., also interested in swivel hook, rotary swivel, hose connection, large size fish tail bits and other appurtenances for use near Denver, Colorado. State manufacturers name of all equipment. S. B. Geiger & Company, 37 W. Van Buren St., Chicago, Illinois.

Mailing Lists

OF ROYALTY investors by deed, guaranteed. Oil Industry Mailing List Co., Tulsa Loan Building, Tulsa, Oklahoma.

ROYALTY OWNERS
Names and addresses in any state.
Royalty Lists, Box 105, Ft. Worth.

Help Wanted

WANTED: High class salesmen for excellent Texas proposition in heavy lease and drilling campaign along Balcones play. SEC. complied with. Penn Oil Corporation, 706-12 Herskowitz Building, Oklahoma City, Oklahoma.

LARGE corporation desires services of sales engineer to cover Texas, Oklahoma territory. Must have previous experience selling lubricated plug valves to oil field and industrial trade. Salary and limited drawing account. Give complete qualifications. Address Box H-281, The Oil and Gas Journal, 415 Lexington. Ave., New York City.

WANTED: Responsible drilling contractor to drill several 1200 foot wells in proven territory. Cash payment upon satisfactory completion. State type of rig. Address Box H-282, The Oil and Gas Journal, Tulsa, Oklahoma.

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22—Tulsa, National Stripper Well Association.

25-27—New York, A.G.A. Production and Chemical Conference.

25-28—New Orleans, La., National Association of Purchasing Agents Convention.

29-31—Dallas, Tex., National Oil Scouts Association, Baker Hotel.

June

17-20—Dallas, Tex., American Society of Mechanical Engineers.

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June - July

29-July 3—Atlantic City, N. J., A.S.T.M., annual meeting.

September

7-12—Pittsburgh, Pa., American Chemical Society, semiannual meeting.

?—Tulsa or Oklahoma City, American Petroleum Institute, Division of Production, Mid-Continent district.

October

?—Cleveland, Ohio, American Institute of Mining and Metallurgical Engineers.

November

9-12—Chicago, American Petroleum Institute seventeenth annual meeting.